

No. 13,289

**In the United States Court of Appeals
for the Ninth Circuit**

STATE OF WASHINGTON DEPARTMENT OF GAME; STATE
OF WASHINGTON DEPARTMENT OF FISHERIES; AND
WASHINGTON STATE SPORTSMEN'S COUNCIL, INC., A
CORPORATION, PETITIONERS

v.

FEDERAL POWER COMMISSION, RESPONDENT,
CITY OF TACOMA, WASHINGTON, INTERVENER

BRIEF FOR RESPONDENT, FEDERAL POWER COMMISSION

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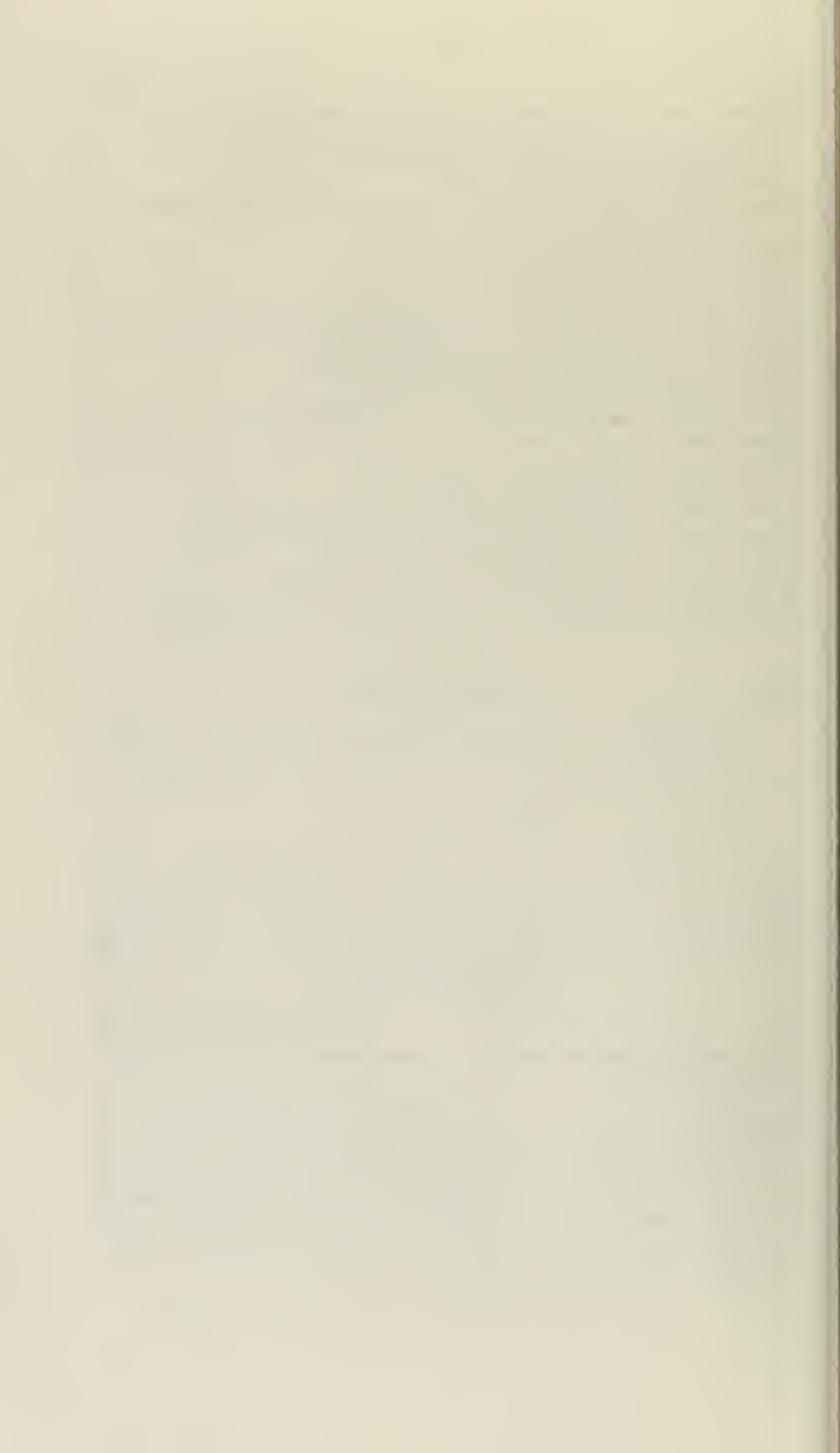
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BRIEF FOR RESPONDENT, FEDERAL POWER COMMISSION

JURISDICTIONAL STATEMENT

This is a proceeding under Section 313 (b) of the Federal Power Act¹ to review an order of the Federal Power Commission (Commission) issued November 28, 1951 (R. 522-575).² This order issued a license, pursuant to Section 4 (e) of the Act, to the City of Tacoma, Washington, (City) authorizing the construction, operation and maintenance of the proposed Mossyrock and Mayfield water-power developments in

¹ 49 Stat. 851; 16 U. S. C. 791 (a) *et seq.* In lieu of printing as an appendix to this brief the numerous provisions of the Act, which we cite, we are lodging with the clerk pamphlet copies of the Act for more convenient reference.

² A timely application for rehearing filed by Petitioners was denied by Commission order issued January 24, 1952 (R. 579-582).

Lewis County, Washington, designated in the records of the Commission as Project No. 2016, and generally known as the Cowlitz Project.

In an earlier proceeding upon a declaration of intention to construct the proposed Cowlitz Project filed by the City, pursuant to Section 23 (b) of the Power Act,³ the Commission found on March 8, 1949: (1) that the construction and operation of the Mossyrock and Mayfield developments would affect lands of the United States;⁴ (2) that the developments could be so operated as to materially affect the navigable capacity of the Cowlitz River below the site of the proposed developments;⁵ and (3) that the interest of interstate

³ The material part of Sec. 23 (b) provides:

Sec. 23 (b): * * * Any person, association, corporation, State, or municipality intending to construct a dam or other project works across, along, over, or in any stream or part thereof, other than those defined herein as navigable waters, and over which Congress has jurisdiction under its authority to regulate commerce with foreign nations and among the several States shall before such construction file declaration of such intention with the Commission, whereupon the Commission shall cause immediate investigation of such proposed construction to be made, and if upon investigation it shall find that the interests of interstate or foreign commerce would be affected by such proposed construction such person, association, corporation, State, or municipality shall not construct, maintain, or operate such dam or other project works until it shall have applied for and shall have received a license under the provisions of this Act. If the Commission shall not so find, and if no public lands or reservations are affected, permission is hereby granted to construct such dam or other project works in such stream upon compliance with State laws.

⁴ Less than 100 acres out of the more than 10,000 acres of land within the project area are lands of the United States.

⁵ The Commission found the Cowlitz River to be a navigable water of the United States from its mouth to at least Toledo (river mile 34) and that it may be such a navigable water for

or foreign commerce would be affected by construction and operation of either or both of the proposed reservoirs.⁶ Upon the basis of these findings the Commission ordered (8 F. P. C. 748-750) that a license be secured before the reservoirs were constructed.

Notice of the filing of the declaration of intention was sent to the Governor and to the Department of Public Utilities, State of Washington. Neither the State nor the City sought review of the Commission's jurisdictional findings or its order and Petitioners do not deny that the proposed Mossyrock and Mayfield developments are subject to the general licensing authority of the Commission, but contend that the Commission erred in other respects in issuing the license to the City for Project No. 2016.

COUNTERSTATEMENT OF THE CASE

Description of the Cowlitz project authorized by the Commission's order

As an aid to the Court we have inserted a map in the back of this brief, showing in profile and by geographical location, the proposed Mossyrock and Mayfield developments included in the license for the Cowlitz Project.

Mossyrock development

This development would be located on the Cowlitz River at about river mile 65 and would consist of a dam about 510 feet high creating a reservoir which some distance upstream from Toledo. The Mayfield site is only 18 miles upstream from Toledo.

⁶These findings were also contained in the Commission's order of November 28, 1951, here under review (R. 538-539).

would extend about 21 miles upstream and would have a usable storage capacity of 824,000 acre-feet with a 100-foot drawdown; a power house integral with the toe of the dam with initial installation comprising three units of 75,000 kilowatts of capacity each, making a total capacity of 225,000 kilowatts, operating under a gross head varying from 325 to 225 feet, with provision for a fourth unit of the same capacity which may be added in the future; and a substation (R. 4104-06).

Mayfield development

This development would be located on the Cowlitz at about river mile 52 and would consist of a dam about 240 feet high creating a reservoir which would extend 13½ miles upstream to the Mossyrock dam and would have a usable storage capacity of 21,000 acre-feet with a 10-foot drawdown; an 880-foot tunnel to a power house downstream with initial installed capacity comprising three units of 40,000 kilowatts of capacity each, making a total capacity of 120,000 kilowatts, operating under a gross head varying from 185 to 175 feet, with provision for a fourth unit of the same capacity; and a substation with transmission lines connecting the two power plants to a substation on the outskirts of Tacoma (R. 4106-07).

Power benefits

The project will provide 345,000 kilowatts of installed capacity of which the average dependable capacity will be 275,000 kilowatts. The average annual energy output will be 1,400 million kilowatt-hours (R. 4114).

Fish conservation facilities

The two high dams in series would prevent the natural upstream and downstream migration of anadromous fish in the Cowlitz River and would affect those fishery resources. In order to conserve those resources the City proposes to provide a means of passing anadromous fish over or through the dams, both upstream and downstream. Further, by provision of fish hatchery facilities and through stream improvements, the City proposes to overcome any remaining adverse effects of the dams and, if possible, to enhance the fishery potential. In the interest of brevity, the fish facilities are not described in detail here but such a description is given in Appendix C to this brief.

The general plan is to pass the fish upstream over the dams by means of fish ladders or by trapping and hauling, or by both methods, if necessary, and to pass the young fish, or fingerlings, and adult fish downstream through the Mossyrock dam by means of a system for screening entrances to the turbines and by inducing the fish to enter water passages into the dam where they will be collected, depressurized, and released into the fish ladders. At the Mayfield dam there will be no collection chamber or depressurizing of the fish. The fish migrating downstream are to be screened near the surface in front of the tunnel intakes and passed directly into a fish ladder for descent into the natural channel below the dam (Ex. 14).

The plan to conserve the fishery resources was not presented as a final plan, and the Commission said it realized there were untried and novel features in the various means and methods proposed for passing fish upstream and downstream past the dams (R. 532-536, 548-549). Consequently, the Commission inserted provisions in the license requiring the City, before beginning construction of any permanent fish ladders or other fish-handling facilities, to make further studies, tests, and experiments to determine the probable effectiveness of such facilities and devices and to obtain Commission approval of the plans for such facilities. In addition, the City is required, in making such studies, tests and experiments, to cooperate with the United States Fish and Wildlife Service and the Washington State Departments of Fisheries and Game (R. 559).

The project, as licensed, will include such fish ladders, fish traps or other fish-handling facilities or fish-protective devices, as may be later approved by the Commission (R. 555), and the license provides that the City shall construct, operate and maintain such facilities for the conservation of fish and make such steam improvements and provide such hatcheries and similar facilities and comply with such reasonable modifications of the project structures and operation in the interest of fish as may be later prescribed by the Commission (R. 559-560).

Navigation and flood-control features

The substantial navigation and flood-control benefits to be provided by the Cowlitz Project are discussed in detail later, *infra* p. 42.

Interest of petitioners

There is no real controversy between the Petitioners and the City except for the question of fish conservation, and in the absence of that question the Petitioners would have no substantial basis for or interest in opposing construction of the project (Pet. Br. 3, 15). The other questions raised by Petitioners are pressed solely in an effort to invalidate the license on any possible grounds, whether or not related to the fishery issue, and not by reason of any other direct interest.

The Commission's conclusions and order

The Commission made detailed findings in support of its conclusion that the Cowlitz Project is best adapted to a comprehensive plan of development for all public purposes, including the conservation and preservation of the fishery resources of the Cowlitz River (R. 539-552). With respect to the fishery problem, the Commission concluded (R. 536):

* * * The question posed does not appear to us to be between all power and no fish but rather between large power benefits (needed particularly for defense purposes), important flood control benefits and navigation benefits, with incidental recreation and intangible benefits, balanced against some fish losses, or a retention of the stream in its present natural condition until such time in the fairly near fu-

ture when economic pressures will force its full utilization. With proper testing and experimentation by the City of Tacoma, in cooperation with interested State and Federal agencies, a fishery protective program can be evolved which will prevent undue loss of fishery values in relation to the other values.

Under these circumstances, the Commission entered its order of November 28, 1951, issuing a license for the Cowlitz Project (R. 537-575). It is this order which the Petitioners would have this Court set aside.

QUESTIONS PRESENTED

The petition for review raises the following questions for determination by the Court:

1. Do the provisions of the Federal Power Act, particularly Section 9 (b) thereof, require State approval of a proposed power project in order to validate a license thereunder?

2. Are State laws for the protection of fishery resources saved from supersedure by the Federal Power Act so as to invalidate a Federal license which is in conflict with such State laws?

3. Is a Federal Power Act license which is in conflict with State fishery laws made invalid because issued to a municipality, an agency of the State?

4. Does the record support the challenged findings upon which the Commission based its order issuing a license for the Cowlitz Project?

SUMMARY OF ARGUMENT

This case involves a controversy which has arisen between two important groups within the State of

Washington. One group, represented by Petitioners, insists upon the retention of the Cowlitz and other important rivers in their natural condition for the production of fish. The other group, represented by the City of Tacoma, believes that by intelligent planning the Cowlitz River can be made of greater usefulness to man without impairment of its ability to produce fish. The second group would not only follow fish-protection and fish-culture methods which have already been found to be effective, but also would initiate new means to solve new problems; and in addition would provide flood control and navigation and sanitation improvement and would materially add to the wealth of the area by the production of sizeable blocks of electric power which are urgently needed in the economic growth of the region.

The Commission considered the application of the City of Tacoma in accordance with the standards prescribed in the Federal Power Act for comprehensive development of the Cowlitz River as related to the Columbia River watershed and authorized a license under that Act with those conditions which it decided would protect all public interests and contribute to the economy of the region. Fundamentally the Petitioners rely upon the supremacy of State fishery laws, whereas it has been firmly established that Federal authority exercised by Congress in the Federal Power Act must be paramount.

The Commission, having authority to issue a license for this development, is required to prescribe reasonable license conditions which will protect and conserve those fishery resources as one of the public benefits

to be maintained in river development. The Wildlife Resources Act of 1946 is in accord with the Congressional policy of leaving to the Commission the determination of what recommendations by a State fish or wildlife agency shall be adopted in the issuance of Federal Power Act licenses.

The fact that the licensee in this instance is a municipality and therefore an agent of the State of Washington does not call for any determination by this Court in the review of the Commission's order, because such review is limited to the authority of the Commission to issue the order, not the authority of the licensee to carry out the provisions of the license.

The Commission's findings and order here are not only in accordance with law but are supported by substantial evidence. This Court, and the Supreme Court, have recognized the responsibility placed in the Commission by Congress to decide upon the measures best suited for water-power development and have recognized the limitation of the judicial function to an examination of the basis for the conclusions reached by the Commission rather than a judicial weighing of the evidence as proposed by Petitioners.

The Petitioners profess to be unaware of any power supply shortage in the Pacific Northwest, notwithstanding the frequent power curtailments which have been put into effect from time to time since 1948. During most of the time from 1946 through 1949 the runoff in the streams of the region was substantially in excess of minimum flows of record and consequently it was possible for the hydroelectric

plants, which supply the bulk of the load, to operate in excess of their dependable capacity. Nevertheless, in every winter since 1948 there have been shortages and even in the winter of 1949 to 1950, when the stream flow was better than average, it was necessary to drop large industrial loads. The plants in this area are interconnected and diversity of stream flows and loads is utilized to assist in meeting regional peak loads. But it has been necessary to drop substantial loads due to a lack of power supply as predicted by the Commission in its order of November 1951. Power studies by other agencies support the Commission's predictions that the power supply will not be adequate to meet the estimated loads in the future, including loads for defense industries. In suggesting possible substitute sources of hydroelectric power supply, Petitioners refer to power developments which are either under construction, or are already included in plans for providing future power supply to the region and, therefore, were considered by the Commission in determining the need for the Cowlitz Project.

In addition to the substantial blocks of power which the Cowlitz Project would make available to serve the needs of the City of Tacoma and other systems in the region, that project, through the Northwest power pool, would materially assist in stabilizing the power pool transmission operations and in meeting regional peak loads. Also, the Cowlitz Project will assist in reducing floods in the river downstream from the dams, will improve navigation and reduce pollu-

tion, as well as provide two large lakes suitable for recreational uses.

The Commission's conclusions with respect to the fish-protection measures which should be provided are also amply supported by the record, much of which came from witnesses of Petitioners. The Petitioners, of course, are primarily interested in conservation measures, but instead of cooperating to secure a large-scale laboratory in the Cowlitz Project facilities they have steadfastly refused to accept even the plain evidence before them. For example, the license requires the City to carry on extensive fish hatchery operations which the Petitioners regard as practically valueless notwithstanding the allocation, for fish hatcheries of the same type, of about half of the \$20 million expenditure proposed under the Lower Columbia Fisheries Program which has otherwise been relied upon by the Petitioners. If fish hatcheries are unsuccessful, the State of Washington as well as other States in the Northwest and elsewhere are presently wasting considerable sums in other hatcheries in efforts to conserve anadromous fish similar to those in the Cowlitz.

The Commission recognized that additional study and experimentation will be required to solve the biological problems in connection with certain facilities proposed to pass anadromous fish upstream and downstream over or through high dams. Consequently, it prescribed measures for this purpose which, within the scope of present information, give every promise of success. The investment of \$9,400,000 and the annual expenditure of some \$610,000 is far in excess of the

net value of the fish which might conceivably be lost, even according to the liberal fish values suggested by Petitioners.

The Commission has not only given full consideration to the important problems facing it in this situation, but, as the agency made responsible by Congress for determination of these questions, has used every precaution possible to see that the wealth of the area is increased in accordance with sound conservation practices. The order should be affirmed.

ARGUMENT

I

The failure of the City of Tacoma to secure State approval for the Mossyrock and Mayfield dams is not a bar to issuance of a license for those dams

Petitioners contend that the Commission was without authority to issue its order licensing the Cowlitz Project because the City has not complied with applicable laws of the State of Washington (Pet. Br. 14, 29, 32, 58, 74), which are set forth in detail (Pet. Br. 33-37).

As these laws relate to the Cowlitz Project, their apparent purpose is to reserve the Cowlitz River in its present natural condition for the production of fish by prohibiting the construction of that project. For the purposes of this review the principal State law to be considered is the "Sanctuary Act" which, if effective here, would bar construction of the Cowlitz Project.⁷

⁷ The other State laws cited by Petitioners as a bar to the issuance of a valid license are less restrictive than the "Sanctuary Act" and, consequently, they would not be an effective bar to issuance of a valid license if the "Sanctuary Act" is ineffective.

There is no real controversy here with respect to water rights, as such. There is no evidence of record that the water-power use of the waters of Cowlitz River as proposed here would adversely affect or interfere with any vested water right acquired by other persons pursuant to State law.

State regulation of fisheries is subject to superior right of United States to regulate interstate and foreign commerce

As the very heart of their contentions here, the Petitioners say that the "Sanctuary Act" is for the purpose of protecting the fish life in public waters of the State, a purpose well within the police power of the State and, further, that the power to regulate fisheries was not among the powers delegated in the Constitution by the States to the Federal Government, being reserved exclusively to the States (Pet. Br. 41-44). But Petitioners mis-state the law when they contend that the State's authority over fisheries in navigable waters is in no way diminished by what they call the "qualified jurisdiction" of the United States over such waters (Pet. Br. 47).

The cases cited by Petitioners as placing fish life in a special category do not support their contentions in this respect. *McCready v. Virginia*, 94 U. S. 391, the leading case relied upon by Petitioners, clearly recognizes that the State right of regulation of fisheries is subject to the superior right of Congress under the commerce clause. In that case, the Supreme Court said that so far as fish are capable of ownership while running, the States owns them but, said the Court (pp. 394-395):

The title thus held is subject to the paramount right of navigation, the regulation of which with respect to interstate or foreign commerce, has been granted to the United States.

The assertion of Federal authority over fishery resources which the Court found to be lacking in the *McCready* case will be found in the Power Act as we show later, *infra* pp. 16-20.

The supremacy of the Federal power over natural resources has been affirmed in other cases. In the case of *Toomer v. Witsell*, 334 U. S. 385 the Supreme Court held that a provision in the laws of South Carolina requiring non-residents to pay a license fee of \$2,500 for each shrimp boat, and residents to pay only \$25.00 violated the privileges and immunities clause of Article IV, Section 2, of the Constitution, and that another provision requiring owners of shrimp boats, fishing in the maritime belt off South Carolina, to dock at a South Carolina port, unload, pack and pay a tax on the catch before shipping or transporting it to another State, burdened interstate commerce in shrimp in violation of the commerce clause of Art. I, § 8, of the Constitution.⁸

In *Lewis Blue Point Oyster Co. v. Briggs*, 229 U. S. 82, the Supreme Court held that when the Federal

⁸ See also *Foster Packing Co. v. Haydel*, 278 U. S. 1. In *Takahashi v. Fish and Game Commission*, 334 U. S. 410, decided on the same day as the *Toomer* case, the Supreme Court held invalid under the Federal constitution and laws a California statute which barred issuance of commercial fishing licenses to persons "ineligible for citizenship" and precluded such a person from earning his living as a commercial fisherman within three miles of the California coast.

Government, in the interest of navigation, deepened the channel across a navigable bay, the bed of which was used for oyster cultivation under grants from the State, the property of the lessor in the oyster beds was not taken within the meaning of the Fifth Amendment.

These cases show beyond a doubt that the right of the State of Washington to regulate the fisheries in the Cowlitz River is subject to the dominant and superior right of the United States to adversely affect those fisheries or, if necessary, to destroy them without compensation⁹ in the exercise of the Federal authority under the commerce clause of the Constitution. Regulation of fisheries is an exclusive right of the State of Washington only for so long as the exercise of that power does not conflict with the exercise of some paramount Federal constitutional power such as the power to regulate commerce involved here.

The Federal Power Act authorizes this license

Apart from the unsupportable assertion that State police powers over fish and wildlife are among the powers generally reserved to the States, the Petitioners contend that the Federal Power Act does not purport to confer upon the Commission any authority to destroy or control the natural resources of a State (Pet. Br. 48-68). But the authority of the Commission in this respect is firmly established, although the

⁹ Of course, there will be no destruction here. Under the license issued by the Commission the City of Tacoma, in cooperation with State and Federal agencies, must make every effort to conserve the fishery resources.

suggestion of Petitioners that the fishery resources of the Cowlitz River will be destroyed is wholly unfounded.

The licensing authority of the Commission rests upon the constitutional power of Congress to regulate commerce. The authority of the Federal Government over the navigable waters of the United States includes authority to create obstructions to navigation (*South Carolina v. Georgia*, 93 U. S. 4); to prevent obstructions in non-navigable tributaries where lower navigable capacity would be substantially impaired (*United States v. Rio Grande Irr. Co.*, 174 U. S. 690); to construct a dam across a navigable river for the purpose of improving navigation and controlling floods without first obtaining approval from the State (*Oklahoma v. Atkinson*, 312 U. S. 508; *Arizona v. California*, 283 U. S. 423); and to license under the Federal Power Act the erection of obstructions in navigable streams even without provision for the passage of vessels (*United States v. Appalachian Power Co.*, 311 U. S. 377; *First Iowa Coop. v. Power Comm'n*, 328 U. S. 152; *State of Iowa v. Power Comm'n*, 178 F. 2d 421, certiorari denied 339 U. S. 979).

Also, the United States is not liable for the impairment of economic interests resulting from river improvement (*United States v. Willow River Power Co.*, 324 U. S. 499; *United States v. Commodore Park*, 324 U. S. 386; *United States v. Chicago, M., St. P., and Pac. R. Co.*, 312 U. S. 592; *United States v. Chandler-Dunbar*, 229 U. S. 53; *Bedford v. United States*, 192 U. S. 217; *Scranton v. Wheeler*, 179 U. S.

141; *Gibson v. United States*, 166 U. S. 269). Therefore, the onus is not upon the Commission to sustain the recognized supremacy of the Federal power over navigable streams, but upon the Petitioners to show that the regulation attempted here differs materially from the Federal regulation already sustained by the Supreme Court, notwithstanding State laws.

The necessity for recognition of the supremacy of the Federal regulation provided by the Power Act is evidenced from its provisions and general purpose. While the Federal Power Act is a regulatory measure, the conditions under which licenses may be issued marks it as affirmative rather than merely prohibitory regulation. The Supreme Court pointed out in the *First Iowa* case (328 U. S. at 180) that the Power Act:

* * * was the outgrowth of a widely supported effort of the conservationists to secure enactment of a complete scheme of national regulation which would promote the comprehensive development of the resources of the Nation, insofar as it was within the reach of the federal power to do so, instead of the piecemeal, restrictive, negative approach of the River and Harbor Acts and other federal laws previously enacted.

Similar recognition of the affirmative purpose of the Power Act appears in *New Jersey v. Sargent*, 269 U. S. 328, 337; *United States v. Appalachian Power Co.*, 311 U. S. 377, 424, 427-428.

In the *First Iowa* case, 328 U. S. at 181, the Supreme Court said that "the detailed provisions of the Act providing for the federal plan of regulation

leave no room or need for conflicting state controls.” At the same time, the Court said that the evidence of compliance with the State laws called for in Section 9 (b) of the Act was purely for the information of the Commission (328 U. S. at 177). When the *First Iowa* controversy came up the second time, the Commission had issued a license without any showing that the applicant had complied with the State laws for the water-power use of the navigable Cedar River, notwithstanding a prohibition in the State law against the diversion proposed. The validity of the license was directly affirmed in *State of Iowa v. Power Comm’n, supra*.¹⁰

The sanctity of State laws, moreover, was directly asserted in the *Appalachian* case, *supra*, as a separate ground against the validity of the license there offered under the Power Act. Forty-one States joined with the Power Company in objecting to the issuance of a license carrying the acquisition clause of Section 14 of the Act on the ground that if the Federal Government could take over a natural resource such as water-power, it could as logically allow “similar acquisition of mines, oil or farmlands as consideration for the privilege of doing an interstate business. The states thus lose control of their resources and

¹⁰ Another Court of Appeals recently held that the cost of water-power rights alleged to have been acquired under State law was properly chargeable as project operating expense, *Niagara Mohawk Power Co. v. F. P. C.*, C. A. D. C., case No. 10,862, decided December 31, 1952. However, the court there was not required to rule upon the necessity for compliance with State laws to validate operation of the project under the F. P. C. license. One judge dissented and a petition for certiorari has been filed.

property is withdrawn from taxation in violation of the Tenth Amendment” (at 421). Nevertheless, the validity of the license was upheld by the Court and the license conditions to which objection was made were held to have an obvious relationship to the exercise of the commerce power. “The Congressional authority under the commerce clause is complete unless limited by the Fifth Amendment” (at 427).

The license for the Cowlitz Project was issued for the development of a navigable stream and for project works to occupy lands of the United States and affect lower navigable capacity. Such projects are clearly authorized by the Act.

Rather than repeat here the legislative history, the background material, and the particular provisions of Part I of the Federal Power Act which show that Congress delegated to the Commission the sole responsibility to determine what projects should be licensed under that Act, we respectfully refer the Court to our discussion of those subjects appearing at pages 17-20 of our brief in *State of Oregon v. Federal Power Commission*, No. 13,345, and pages 19-23 of our brief in *United States v. Federal Power Commission*, No. 13,265, filed in this Court in February and March 1953, respectively.

The Commission has the authority and duty to prescribe fish-protective measures

Petitioners contend that even if the “Sanctuary Act” does not invalidate the license the laws of the State must govern insofar as fish-protective measures are concerned. Petitioners say that the State legislature has reserved the use of the waters of the Cow-

litz River for anadromous fish and has prohibited other uses which would interfere with that use and they contend that Section 27 of the Federal Power Act prohibits the Commission from interfering with the determination of the State to so use those waters (Pet. Br. 47-48).

Aside from the limitation of Section 27 to State laws protecting consumptive water uses, Petitioners overlook Section 18 of the Power Act which provides that the Commission "shall require the construction, maintenance, and operation by a licensee at its own expense of * * * such fishways as may be prescribed by the Secretary of Commerce [Secretary of the Interior]." Had Congress intended by the provisions of Section 27 to reserve to the States the right to the exclusive use of waters of navigable streams for anadromous fish or to make the validity of a license depend upon State approval of fishery facilities, there would have been no need for the provisions of Section 18. In that section Congress directed specifically what action the Commission should take with respect to fishways without regard to State law on the subject.

That Congress did intend to assert Federal control over fish and wildlife resources affected by Federal water projects and by projects to be constructed by *any public or private agency under Federal license*, is furthermore clearly demonstrated by the Wildlife Resources Act of August 14, 1946 (60 Stat. 1080, 16

U. S. C. 661),¹¹ which provides a procedure for State and Federal cooperation with a view to preventing loss or damage to fish and wildlife resources affected by any such project. This 1946 statute requires that "due consideration be given to the requirements of those resources [fish and wildlife] as well as the requirements of such other resources as may be affected by those programs," as stated in House Report No. 1944, 79th Congress, 2d session.¹² The application of that Act here would require the Federal Power

¹¹ The statutory provision in question is Sec. 2 of the Act of August 14, 1946, which reads as follows:

"Sec. 2. Whenever the waters of any stream or other body of water are authorized to be impounded, diverted, or otherwise controlled for any purpose whatever by any department or agency of the United States, or by any public or private agency under Federal permit, such department or agency first shall consult with the Fish and Wildlife Service and the head of the agency exercising administration over the wildlife resources of the State wherein the impoundment, diversion, or other control facility is to be constructed with a view to preventing loss of and damage to wildlife resources, and the reports and recommendations of the Secretary of the Interior and of the head of the agency exercising administration over the wildlife resources of the State, based on surveys and investigations conducted by the Fish and Wildlife Service and by the said head of the agency exercising administration over the wildlife resources of the State, for the purpose of determining the possible damage to wildlife resources and of the means and measures that should be adopted to prevent loss of and damage to wildlife resources, shall be made an integral part of any report submitted by any agency of the Federal Government responsible for engineering surveys and construction of such projects."

¹² See also Senate Report No. 1698 and Senate Report No. 1748, both of the 79th Congress, 2d session, on H. R. 6097, and also statement by Representative A. Willis Robertson, author of the bill, at pages 12 and 14 of the Hearings before the House Committee on Agriculture, February 13 and April 15, 1946.

Commission to consult with the local agencies, in this instance the Washington State Fisheries and Game Commissions, and to obtain their recommendations with respect to the fish and wildlife resources affected by the Cowlitz Project. But there is no provision in the 1946 Act requiring the Commission *to adopt* the recommendation of any State agencies. Insofar as the 1946 Act is concerned, the final decision as to how the fishery resources problem is to be handled is left up to Congress in the case of a Federal project, and is left up to the Federal Power Commission in cases involving projects licensed under the Federal Power Act.¹³

As we have shown (*supra* pp. 14-16), the United States may, in the execution of its constitutional power over interstate or foreign commerce, adversely affect or destroy fishery resources in navigable waters of the United States. Having this authority, the United States may provide measures for the protection of those fishery resources, particularly where the State agencies concerned (Petitioners here) have refused or failed to recommend such protective measures, and under the provision of Section 18 and other sections of the Act the Commission is under a duty to prescribe such measures.

Whether the City, as a municipal corporation, may proceed with the project under Federal license is not a proper question for decision here.

Petitioners challenge the authority of the City, a municipal corporation as distinguished from a private corporation, to proceed with construction and opera-

¹³ See *State of Iowa v. F. P. C.*, *supra*.

tion of the Cowlitz Project under its Federal license in derogation of the State "Sanctuary Act". (Pet. Br. 68)

This question is not before the Court. Section 4 (e) of the Power Act expressly authorizes the issuance of licenses to municipalities and Petitioners do not say that the City of Tacoma is not a municipality within the meaning of the Power Act. The review sought by Petitioners here goes solely to the validity of the Federal license. In the Power Act Congress made no attempt to regulate those matters which are of purely local concern,¹⁴ but limited itself to those statutory provisions which would insure effective national control over water power development. *First Iowa Coop.* 328 U. S. at 181. The applicability of State laws to the Commission's licensee, the City of Tacoma, as a State agency is raised in a proceeding in the Superior Court of the State of Washington for Thurston County, *City of Tacoma v. Taxpayers, et al.*, No. 32,411.

II

**The Commission's findings here are in accordance with law
and are supported by substantial evidence**

Petitioners argue that the basic findings and conclusions in the Commission's opinion and order (R. 522-562) are not supported by substantial evidence and that the Commission has exceeded the power con-

¹⁴ See remarks of Representative William L. La Follette of Washington, a member of the Special Committee on Water Power, which reported the bill that became the Power Act, 56 Cong. Rec. 9810.

ferred upon it, has not fulfilled the obligation imposed upon it by Section 10 (a) of the Federal Power Act to approve only comprehensive plans, and has acted arbitrarily and capriciously (Pet. Br. 14-15, 18-28, 29-30, 75-109).

Scope of review.—With respect to the scope of court review permitted under the Power Act, Section 313 (b) provides that the findings of the Commission as to the facts, if supported by substantial evidence, shall be conclusive.

The scope of court review permissible under the Act was recently defined by the United States Supreme Court in *United States v. Federal Power Commission, et al.*, decided March 16, 1953. In affirming an order of the Commission issuing a license for a water power project on the Roanoke River, at Roanoke Rapids, North Carolina, over the objections of the Secretary of the Interior, the Court said (73 S. Ct. 609, 619) :

Subordinate arguments are made bearing partly on the power of the Commission to issue any license for private development and partly on the Commission's exercise of its power in granting this license. The arguments involve technical engineering and economic details which it would serve no useful purpose to canvass here. Once recognizing, as we do, that the Commission was not deprived of its power to entertain this application for a license, we cannot say, within the limited scope of review open to us, that the Commission's findings were not warranted. Judgment upon these conflicting engineering and economic issues is precisely that which the Commission exists to determine, so long as it cannot be said, as it

cannot, that the judgment which it exercised had no basis in the evidence and so was devoid of reason.

The Court may not substitute its judgment for that of the Commission. As was said by the Supreme Court in *National Labor Relations Board v. Link Belt Company*, 311 U. S. 584, 597:¹⁵

Congress entrusted the Board, not the Courts, with the power to draw inferences from facts. *National Labor Relations Board v. Pennsylvania Greyhound Lines*, 303 U. S. 261, 271; *National Labor Relations Board v. Falk Corp.*, 308 U. S. 453, 461. The Board, like other expert agencies dealing with specialized fields (see *Rochester Telephone Corp. v. United States*, 307 U. S. 125, 146; *Swayne & Hoyt v. United States*, 300 U. S. 297, 304), has the function of appraising conflicting and circumstantial evidence, and the weight and credibility of testimony.

This Court properly defined its permissible scope of review under the Federal Power Act in *Montana Power Company v. Federal Power Commission*, 112 F. 2d 371, when it said (p. 374):

¹⁵ See and compare, also, *National Labor Relations Board v. Stowe Spinning Co.*, 336 U. S. 226, 231; *Mississippi Valley Barge Line Co. v. United States*, 292 U. S. 282, 286-287; *International Assoc. of Machinists v. National Labor Relations Board*, 311 U. S. 72, 82; *Gray v. Powell*, 314 U. S. 402, 412-413; *National Labor Relations Board v. Nevada Consolidated Copper Corp.*, 316 U. S. 105; *Virginia Electric & Power Co. v. National Labor Relations Board*, 319 U. S. 533, 542; *Dobson v. Commissioner*, 320 U. S. 489, 501-502; *National Labor Relations Board v. Pittsburgh Steamship Co.*, 337 U. S. 656, 659-660.

The Commission is required to exercise its judgment, as provided in § 10 (a) of the act. The license to be issued is subject to the condition that “the project adopted * * * shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan * * * for the improvement and utilization of water-power development * * *.” The act leaves to the discretion of the Commission what project shall “be best adapted to a comprehensive plan” for such improvement and utilization. “The judicial function is exhausted when there is found to be a rational basis for the conclusions approved by the administrative body.” *Rochester Tel. Corp. v. United States*, 307 U. S. 125, 146, 59 S. Ct. 754, 765, 83 L. Ed. 1147, and cases there cited.

As we show *infra* pp. 27-55, there is a rational basis in the evidence of record to support the Commission’s judgment in issuing the license for the Cowlitz Project.

Neither the Army Engineers’ 1948 Comprehensive Plan nor the Lower Columbia Fishery Plan is a bar to issuance of the license here

Petitioners contend that the Commission’s finding No. 59, made pursuant to Section 10 (a) of the Act, operates to destroy the established comprehensive plan of the Lower Columbia River Basin area and the Lower Columbia Fishery Plan (Pet. Br. 30, 76-80). The Commission gave full consideration in its Opinion and Order to this contention (R. 527-529, 547-548), and set forth fully its reasons why, in its judgment, it was not in the public interest to deny the license for the Cowlitz Project.

Petitioners claim that the Army Engineers 1948 Review Report on the Columbia River (House Doc.

No. 531, 81st Cong. 2d Sess.) recommended indefinite postponement of any water-power development on the Cowlitz River and also claim that issuance of the license would be contrary to the Lower Columbia Fishery Plan (Pet. Br. 76-80). But, as the 1948 Review Report shows (R. 408) the power from the Cowlitz Project was not required in the area when that report was being prepared because adequate power was then available from other sources.

The adequacy of the supply prior to 1948 was pointed out by the Commission in its November 1951 order, but by 1951 the increased demands had made the available supply wholly insufficient and new generating sources were required. The Commission, in reporting on the Army's comprehensive development plans, confined itself primarily to power features of the proposals. It called attention in 1951 to the restricted scope of its earlier study of the 1948 Army Review Report, and said it had not previously considered the fishery measures (R. 527-529). Also, of course, Congress has not approved the 1948 Review Report or the Lower Columbia Fishery Plan, both of which are still being revised (R. 552). Comprehensive plans are, of necessity, flexible in order to meet changing conditions.

There is a rational basis for the Commission's conclusion that the Cowlitz Project is best adapted to a comprehensive plan of development

Petitioners would have this Court believe that the Commission, with callous disregard of local interests and by arbitrary and capricious exercise of the power conferred upon it by the Power Act, authorized the

destruction of valuable fishery resources through construction of this power development in such a way as to completely prevent the use of a large portion of the stream for any other purposes, including the propagation of fish, with its attendant loss in recreational and commercial values. This was not the case, but on the contrary, the Commission took into account a substantial investment in excess of \$9,400,000 (R. 550) proposed by the City and large annual expenditures (\$610,000, R. 550) to provide adequate fish conservation facilities and required further that studies, tests and experiments be made by the City in cooperation with Petitioners, prior to construction, to determine the best methods and measures to preserve the fishery resources (R. 559).

The efforts of the City to devise and provide adequate measures to protect the fishery resources would also give an opportunity to the Federal and State fish conservation agencies to use the Cowlitz Project without expense to them as a full scale laboratory for testing and devising adequate means of passing anadromous fish upstream and downstream past a high dam, an opportunity that has not heretofore been afforded to those agencies primarily interested in preserving the recreational and commercial values inherent in the anadromous fish runs of the Columbia River Basin.

Petitioners would preserve the fishery values of the Cowlitz River by preventing any utilization of these water resources for the development of power, for the control of floods and abatement of pollution in the

lower stretches of the river, for the improvement of navigation, and by the creation of two lakes having substantial recreational value, notwithstanding the extraordinary measures directed to harmonize the several types of water use.

The several values of these water resources were recognized by the Commission in its finding that the proposed development would be best adapted to comprehensive development of the water resources of this region (R. 552):

(59) Under present circumstances and conditions and upon the terms and conditions hereinafter included in the license, the project is best adapted to a comprehensive plan for improving or developing the waterway involved for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, for the conservation and preservation of fish and wildlife resources, and for other beneficial public uses including recreational purposes.

This finding or conclusion, which conforms to the provisions of Section 10 (a) of the Power Act,¹⁶ is

¹⁶ Section 10 (a) provides, in part:

Sec. 10. All licenses issued under this Part shall be on the following conditions:

“(a) That the project adopted * * * shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, and for other beneficial public uses, including recreational purposes; and if necessary in order to secure such plan the Commission shall have authority to require the modification of any project and of the plans and specifications of the project works before approval.”

the ultimate and only conclusion relating to the beneficial public purposes (including conservation of fish and recreation) required by the Act.

The following analysis of the evidence is presented to demonstrate to the Court that there is not only substantial evidence to support the Commission's findings and order, but that the Commission reached the only reasonable conclusion that could be reached under the facts and law presented.

The challenge of Petitioners to the factual findings and conclusions of the Commission may be divided into two categories: First, those relating to electric power, and second, those relating to the fishery resources of the Cowlitz River. Within the limits of this brief it is not feasible to present a detailed analysis of the factual record upon which the Commission acted. However, substantially the same factual analysis as was presented by the Commission's staff counsel during the proceedings before the Commission appears in the Appendix hereto.

The Commission's findings relating to electric power are adequately supported

The arguments of Petitioners on electric power are found in their brief at pages 19-23, 30 and 80-90.

A. Power situation in the Pacific Northwest

The electric utility systems operating in the Pacific Northwest (Ex. 53, p. 9; Ex. 54) are interconnected and their operations are coordinated (R. 1060-70). The Northwest Region was deficient in dependable power capacity to supply the electric load and to provide adequate capacity reserves from 1946 to 1949

(R. 1073-75, 4111-13, 4144-45, 4149; Exs. 53, 54). Although during those years the amount of load actually carried was in excess of dependable capacity because river flows were in excess of those experienced during an earlier period of most adverse stream flow—also called the period of critical water conditions (R. 1074, 4181)—there was a shortage of power in the Pacific Northwest during the winters of 1947-1948 and 1948-1949 (R. 915). Even when the flow was better than average it was necessary to drop 80,000 kilowatts of industrial load in 1949-1950 (Ex. 23, p. 35). During 1950-1951 a power deficiency was estimated for the Pacific Northwest, and the loads were increasing faster than estimated, due to some industrial activity in the defense program (R. 1067-68, 1086-87, 1123; Ex. 23, pp. 8-10; R. 395-396).¹⁷

The Commission's estimate of the power shortages was confirmed by the Bonneville Power Administration 1952 Advance Program for Defense¹⁸ which shows (p. 19) that deliveries to some industrial plants were curtailed in the winter of 1951-1952. It is common knowledge that there was a serious power shortage during the winter 1952-1953 in the Pacific Northwest, and the Defense Electric Power Administration had to institute a sizeable power curtailment program which reduced substantially the supply of electric

¹⁷ See also Bonneville Power Administration 1951 Advance Program for Defense, pp. 26-27. This program is similar to that appearing in the record as Exhibit 23, except that it is for the year 1951 instead of 1950.

¹⁸ The 1952 program is similar to that appearing in the record as Exhibit 23, except that it is for the year 1952 instead of 1950.

service to important defense loads.¹⁹ These power shortages are attributable in part to inability to maintain the Federal construction schedules of the estimated times when new Federal and non-Federal generating units would come into operation (R. 917-918, 1192, 1231-36, 1375-76; Exs. 21, 23).

The record contains several estimates of future electric loads in the Pacific Northwest (Ex. 21, p. 6; Exs. 23, 24, 54, 55), but such estimates do not include national defense load requirements (R. 4149-51, 4190-91, 4194). The program of future power supply, identified as Schedule S in Exhibit 23, was at the time of the hearings the most recent formalized plan for providing new generating capacity for years up to 1960 (R. 4187-4188). Comparison of these load estimates, which do not include defense loads, with the Schedule S program of power supply (Ex. 23) shows, as found by the Commission (R. 543), that there will be a deficiency in dependable power supply for serving loads and providing required reserves until almost 1960 (R. 4151; Ex. 54).

A speed-up construction program was being prepared at the time of the hearings to provide new sources of electric power supply for defense loads (R. 4187-91). This program for construction of new generating facilities is contained in the Bonneville Power Administration 1951 Advance Program for Defense (R. 395). Table 17 (p. 31) of that Advance Program confirms the Commission finding (R. 543) that there will not be sufficient power to

¹⁹ See Appendix D for details.

supply loads plus 6.7 percent required reserves (R. 1075), until after 1959.

The B. P. A. 1952 Advance Program for Defense shows (p. 37) that there will be an energy deficiency until after 1961, assuming critical stream flow conditions. Comparison of energy supply and demand data on Schedules B and D of the 1952 Advance Program shows that even in a median water year the energy shortage will continue through 1958 and may recur again in 1960-1961. These "Advance Programs" indicate that the Cowlitz River plants could be built in two years. Thus, if these two plants were constructed, the estimated power shortages would be reduced to the extent of their capacity and energy capability, their dependable capacity being 275,000 kilowatts. These later studies by the Bonneville Power Administration confirm the Commission's findings relating to the power shortages in the Pacific Northwest and the value of the Cowlitz Project in alleviating the deficiency.

Petitioners' basic error in their evaluation of the power situation in the Pacific Northwest is their insistence upon using the power supply available under median stream flow conditions as their criterion in attempting to determine the "firm power" supply (Pet. Br. 81-82). Contrary to Petitioners' contention, one may not determine "firm power with median water conditions" (Pet. Br. 82), because firm power must always be available when needed and it is obvious from the use of the term "median" that median

stream flows are not always available when needed.²⁰ The amount of firm power available from a hydroelectric plant is correctly determined by computations based upon flows which have occurred in the past during the period of most adverse stream flow of record and the same standard is used to determine dependable capacity—the true criterion of the dependable capability of a hydroelectric plant (R. 605, 612–614, 4110–11, 4144–50). The method of determining dependable capacity based upon critical stream flow conditions is used, almost without exception, by the utility industry and by the Federal power agencies.²¹

The estimates by Professor Robbins of the future power supply and loads, relied on by Petitioners (Pet. Br. 82), were demonstrably not adequately prepared. He did not make the required estimates of future peak loads and annual energy requirements (R. 2050–52); he used installed capacity (which is greater than dependable capacity) rather than dependable or firm capacity (Ex. 26); he made no stream-flow studies and no reservoir operational studies (R. 2060); and he related the speed-up defense program of power supply to a normal load need and thereby ignored the defense increment of load (Ex. 26). No logical conclusions were drawn by the Commission nor can any be drawn from the estimates of

²⁰ Power available under median stream flow conditions is available only 50 percent of the time and the amount of power available on the system decreases as stream flows decrease below median.

²¹ The Commission has for many years prescribed this method of determining firm or dependable power capability of hydroelectric plants in annual reports filed by public utilities and licensees.

Professor Robbins because of the many deficiencies in his study.

Contrary to the inference by Petitioners that the testimony of Mr. McManus, then Administrator of Defense, Electric Power Administration, indicates that there will be an ample power supply to meet electric loads by 1955 to 1956 (Pet. Br. 82), his testimony merely shows a power shortage limited to that period because the load studies of the Defense Power Administration are prepared for only four years in advance and, consequently, he gave no consideration to the question whether the shortage would continue beyond 1956 as did the Commission staff in its studies of power supply and demand. In fact, he did not say how long the power supply would be critical in the Pacific Northwest (Ex. 64B).

To appraise properly the other data relative to power supply referred to by petitioners, namely, the City's Exhibit 10, plate 19, and Exhibit 23, it is also necessary to take into account required generating capacity reserves of 6.7 percent (*supra*, pp. 33-34). By taking into account the required reserves, the estimate of the shortage period extends to about 1960.

The large curtailment of power in the Pacific Northwest during the winter of 1952-53, brought on by stream flows less than median, refutes the contentions of Petitioners that a completely erroneous impression of the present power situation in that region has been created by the City and that the Commission committed a basic error in using a "critical water year" in evaluating power supply (Pet. Br. 81).

Petitioners contend that the Commission should have considered the Yale Project and six additional generating units at Rock Island Project, all then under construction, as alternate projects for the Cowlitz Project (Pet. Br. 84). The additional units at Rock Island were scheduled for construction at the time of the hearings (Ex. 23, p. 30), and the capacity to be provided by those units was included as part of the future power supply in the studies by the Commission staff (R. 4144, 4149-50, 4187). The capacity of the Yale Project and the additions at Rock Island Project, as well as other proposed private power projects, were also included (p. 14) in the B. P. A. 1951 Advance Program for Defense (R. 395-396), and were considered by the Commission as part of the power supply for defense loads (R. 542-543, findings 13 and 18).

Petitioners complain that the findings of the Commission made no reference to 400,000 kilowatts of steam-electric capacity that might be constructed in the Pacific Northwest by the Federal Government (Pet. Br. 84-85). The proposal to construct Federal steam-electric plants was known to the Commission (R. 396, 4297, 4332) but such plants have not been authorized for construction by Congress. Under the circumstances, the Commission was justified in refusing to rely upon the availability of this purely speculative steam-electric capacity, and it had no basis for assuming that such capacity would be an alternative source of power supply to the proposed Mossyrock and Mayfield projects on the Cowlitz River.

It appears that the Commission exercised good judgment in refusing to assume early construction of the proposed Federal steam-electric plants in the Pacific Northwest because the Eighty-second Congress failed to authorize them and to our knowledge no bill is pending in the present Congress which, if enacted, would authorize their construction. Even if steam-electric plants should be authorized in the Pacific Northwest, they would be for the purpose of firming up the hydroelectric power (R. 4332).

B. Power needs for national defense

In their desire to protect the fishery resources of the Cowlitz River, Petitioners seize upon the idea that the output from the proposed Mossyrock and Mayfield plants is not necessary for defense (Pet. Br. 86-87).

At the time of the hearings national defense loads were coming on the power systems in the Pacific Northwest (R. 1087, 1097, 1140-41, 1402-04) and interruptible loads were mostly those of the aluminum plants (R. 915-916, 1079, 1377-78). Since that time the power situation has become more serious in that the industrial loads being served on an interruptible power basis produce materials essential to the national defense.²² Thus these electric loads, which would have been dropped during normal peace-time operations in event the decreasing power supply approached that available during minimum stream-flow conditions, have acquired the status of firm loads because of the

²² See Bonneville Power Administration 1951 Advance Program for Defense (pp. 26, 27, and 32).

national defense value of their products. Consequently, it is necessary in the Pacific Northwest to institute region-wide curtailments of electric load whenever power supply decreases substantially from that available in a year of median stream flow as was done in the fall and winter months of 1952-1953.

Although not charged with any official responsibility for power distribution, Petitioners would argue that restriction of the amounts of power used by theatre marquees, neon signs, etc., would save sufficient energy to serve defense loads in the event of a shortage of water for power generation (Pet. Br. 86-87). Actually such a program would be hard to police. Defense Electric Power Administration in its curtailment program of 1952-1953 apparently did not consider that enough energy could be saved by restricting energy to only such commercial users. Instead, DEPA instituted a program in November 1952 banning the sale or use of power to serve interruptible loads in the Pacific Northwest, including some defense loads, and ordering a cut of 10 percent in the supply of firm power serving loads in excess of 8,000 kilowatt-hours weekly. In addition, smaller users of power were urged to curtail their use of power on a voluntary basis.²³

The Commission has just been through World War II and has observed the limiting effect of shortage of critical materials on the production of generating facilities. The same situation is here now. The Commission, in its day-to-day dealings with the electric

²³ See Appendix D for more details.

utility industry, is kept informed of the power situation and the Commission found that "the severe power shortage in the Pacific Northwest is a matter of national concern" (R. 524). During 1952, about 2,500,000 kilowatts of steam-electric generating capacity scheduled for service in other areas will not be available until 1953 because of shortage of materials.²⁴ The situation in 1953 is not likely to be better, and the shortage of materials may well continue for several years thereafter. Since hydroelectric power plants do not require critical alloy steels, they are not so adversely affected by such shortages.

Petitioners ignore in their arguments certain basic characteristics of the electric power industry. Electric load growth is beyond the control of an electric utility except where restrictions are placed by governmental authority on the taking on of certain loads. Power supply must always be equal to, or greater than, the electric load at all times, and, if it is not, the electric supply system will slow down and fall apart. This means that in the event of a power shortage, electric loads must be reduced to a point where their total is equal to, or less than, the available power supply. As a practical matter, and to be effective in a power curtailment program, the large loads have to be reduced in spite of their great importance to the national defense.

²⁴ Non-availability of this scheduled steam-electric generating capacity is shown by reports filed with the Commission by electric utilities, particularly FPC Form No. 12-E, Monthly Power Statements.

C. The Proposed Cowlitz River Power Project would provide substantial benefits

The proposed Mossyrock development with initial insallation of 225,000 kilowatts, plus the proposed Mayfield development with initial installation of 120,000 kilowatts,²⁵ would be located about 60 miles from the City of Tacoma (R. 4104-07). This Cowlitz River development of 345,000 kilowatts initial installed capacity would have an average dependable capacity of 275,000 kilowatts over a 50-year period and would produce an average annual output of about 1,400 million kilowatt-hours (R. 4114). If such output were produced by a new steam-electric plant located in the City of Tacoma, the cost of dependable capacity (exclusive of taxes) would be \$14.15 per kilowatt per year, based on 2 percent cost of money, and the cost of energy (exclusive of capacity or fixed costs) would be 3.75 mills per kilowatt-hour (Ex. 52). Based on such unit cost figures, alternative steam-electric power in the amount of 275,000 kilowatts, plus 1,400 million kilowatt-hours, would have a total cost of \$9,141,250 per year, or an average total cost per kilowatt-hour of 6.53 mills. In the economic evaluations, credit was given to replacement of steam-electric energy by off-peak hydro energy at a cost of 2 mills per kilowatt-hour, and it was determined that the Cowlitz Project, exclusive of the costs of fish-handling facilities, will have an average annual excess of power benefits over

²⁵ The City has an application pending with the Commission for authority to install a fourth unit initially in each powerhouse. The installation of the two additional units would increase the inital capacity of the project from 345,000 kilowatts to 460,000 kilowatts.

power cost of \$1,700,000, based on an interest rate of 2.0 percent (R. 4115-17), and the Commission so found (R. 546). This sum was used as net power value in the economic feasibility studies.

Contrary to the contention of Petitioners (Pet. Br. 23) the Cowlitz Project will provide substantial flood control and navigation benefits. The proposed method of operation of the Mossyrock reservoir required by the license would provide 260,000 acre-feet or more flood control which would reduce the flood of record on the Cowlitz River from 140,000 cfs at Castle Rock (about 35 miles downstream from Mayfield), to bank full capacity of 70,000 cfs at Castle Rock where considerable damage was caused by the December 1933 flood (R. 795-797, 1279-80; Ex. 5, Ex. 10, Pl. 8, Exs. 11, 21). The minimum average flow of the Cowlitz River between Toledo and Castle Rock would be increased from about 1,000 cfs to 2,000 cfs, and the resulting navigation benefits will be direct, and of increasing usefulness adding at least six inches to the navigable depth over shoals (R. 797, 1277-79; Ex. 5). Also, this increase in low flows from 1,000 to 2,000 cfs should be beneficial to fish life, as it would lower the concentration of harmful pollution (R. 2209-10, 2275-77, 2976-77, 3788).

Because of its proposed location and size, the Cowlitz Project would provide essential synchronizing power at an essential point in the Northwest power pool and thereby increase the stability of the electrical network (R. 1148-49, 1285-86); would reduce power flows on transmission lines of Bonneville Power Administration carrying power from the eastern part

of the State of Washington to the Tacoma-Seattle load area and would thereby effect a saving in transmission-line losses (R. 1098-99); would improve service to the western part of the State of Washington through reducing disturbances to loads and amounts of load shedding²⁶ (R. 921-922, 1088-90, 1102-07, 1125-28, 1282-83); would, due to diversity of stream flows between the Cowlitz and Columbia Rivers, provide a block of power to the Northwest pool in addition to its own system dependable capacity at time of over-all system peak loads (R. 1117-18, 1285-86, 1677; Ex. 55); and would, at time of floods on the Columbia River, provide assistance to the Portland area when generation is seriously curtailed at the Bonneville power plant (R. 1284-85). In order to test the Cowlitz Project by the most severe economic standards, not one of these many additional benefits was assigned a dollar value for use in the economic feasibility studies.

The proposed Cowlitz Project will provide two lakes which will offer recreational opportunities because of their easy accessibility and availability of nearly full reservoirs during the seasons when recreational use would be greatest (R. 1280-81, 1627, 1631; Ex. 10, Introduction, p. 1). The creation of large projects with reservoirs brings many visitors and recreational facilities are usually provided to serve the public (Army Engineers Columbia Review Report, House Doc. No. 531, p. 98).

²⁶ Load shedding means dropping load through inability to supply it for any reason.

The installation at the Cowlitz Project of 345,000 kilowatts initially, and 460,000 kilowatts ultimately, would assist in alleviating the power shortage in the Pacific Northwest (*supra* pp. 34, 41-42; Ex. 21, p. 20). It would also ease some of the restrictions on taking on of new load by the City and also provide more freedom in formulating electric sales policies (R. 1266, 1288-89, 1376, 1419, 1663-64, 1679-81). Section 9 (d) of the contract under which the City purchases power from the Bonneville Power Administration provides that Bonneville will consult with the City before Bonneville serves loads of 15,000 kilowatts or more in the areas served by the City, or serves loads of 2,000 kilowatts or more in the area where the City expresses a desire to serve (R. 638). As the contract provides for consultation only, and not approval by the City before Bonneville takes on such loads, the City would not be assured of a power supply from Bonneville to serve such loads, except upon the pleasure of Bonneville. The construction of the proposed Cowlitz Project would remove this limitation on the power supply available to the City.

The license for the Cowlitz Project was accepted on January 10, 1952 (R. 561-62). If construction should start by January 1954, part of the project could be in service by January 1956 and the rest shortly thereafter (R. 47, 1177, 1276-77; Ex. 648). This still would be in time to provide a sizeable addition to the power supply of the Pacific Northwest and alleviate part of the power shortage. Furthermore, in considering the capability of the Cowlitz Project to alleviate the power shortage the Commis-

sion was not required to assume that there would be the delay in construction of the project resulting from this review proceeding.

D. The economics of the proposed Cowlitz Project

In the consideration of the economics of the proposed Cowlitz Project there was before the Presiding Examiner and the Commission a comprehensive analysis of the economics of the fishery resources of the Cowlitz River in relation to the conservation program proposed by the City (R. 74, 116, 134-135) and a similar analysis of the value of Cowlitz power as compared to the value of the fishery resources which might be adversely affected. These analyses are contained in Appendices A and B.

Petitioners contend that the Commission erred in refusing to deny the license on the ground that the Cowlitz Project is not needed and will be of no value to the region since equivalent power may be obtained by construction and operation of new steam-electric generating plants (Pet. Br. 88). In advancing that contention, Petitioners entirely ignore the economics of resources development. They would reserve the Cowlitz River solely for fish production without regard to the savings in power costs to be realized by power development through the Cowlitz Project in lieu of steam-electric power development, not to mention the substantial flood control, navigation and recreational benefits that will accrue to the region through construction and operation of that project. Under Petitioners' theory of economics no

further waterpower development would be permitted in any salmon stream, whether or not the fishery resources therein are of substantial value, because, say Petitioners, all the power needed now and in the future may be produced in new steam-electric generating plants. The fact that the cost of such steam-electric power would be substantially higher than equivalent power to be produced by waterpower is immaterial under Petitioners' theory.

Petitioners' claim that the \$1,700,000 net power value of the Cowlitz Project found by the Commission is too high (Pet. Br. 87), but they have failed to point out any errors in the finding. In addition to this net power value, there are other benefits to be contributed by the Cowlitz Project (*supra*, pp. 42-44) which, in the interest of ultraconservatism, were not assigned any dollar value by the Commission in its consideration of the economics of the project.

It is suggested by Petitioners that the net power profits from the proposed Cowlitz Project would inure to the City whereas destruction of the Cowlitz fishery resources would result in a loss to the entire State of Washington (Pet. Br. 87-88). The City sells power at cost so it does not make a profit (R. 1286-87; Exs. 12, 13). Further, the City as a member of the power pool operating in the Pacific Northwest, would provide power to interconnected systems and the benefits thereof would be State-wide at least (R. 1288-89, 1376, 1415-20). If the City should find it necessary to build steam-electric plants instead of the Cowlitz Project, its customers would have to pay at least \$1,000,000 per year more for power. It is a cardinal

principle of the electric power industry, including publicly owned systems, to provide new increments of power supply at the then lowest possible cost. Contrary to Petitioners' contentions (Pet. Br. 88) the fishery values used by the Commission are all based on testimony and exhibits prepared by Petitioners' fishery experts (see Appendix A).

Petitioners suggest that sources other than the Cowlitz Project are economically feasible, that power from those sources can be marketed at the same rate of six mills to be charged for Cowlitz power, and that the Cowlitz power has no value to the region over and above that capable of being produced from other sources (Pet. Br. 88-89). The rate of six mills is the rate required to pay for the cost of Cowlitz power plus transmission and distribution costs (Exs. 12, 13). Obviously, since steam-electric power would cost at least \$1,000,000 more per year than Cowlitz power, steam-electric power would have to be sold for more than six mills per kilowatt-hour in order to pay the additional annual cost of \$1,000,000. There is no evidence in the record to show how much hydro power from sources other than the Cowlitz Project would cost or whether such power would be as economical due to the greater transmission-line costs (R. 393-396). If the economic theories of Petitioners were to be considered seriously, it would follow that an electric utility no longer need give any attention to the matter of obtaining the lowest cost sources of new power supply in order to serve the ultimate consumers at the lowest possible rates. Rather, Petitioners would ignore the costs because the consumers would have to pay the

bills. Such a theory of economics is lacking in merit and soundness and clearly would not be in the public interest.

The allegation of Petitioners that the Commission gave insufficient consideration to recreational benefits (Pet. Br. 89) is not supported by the record. A full analysis of the recreational benefits to be expected was before the Commission and there is substantial basis for the values the Commission gave thereto (R. 400-407, 423-428; see Appendix A). Nevertheless, in spite of the tenuous basis for the value of existing recreational fishery benefits claimed by Petitioners (R. 3388-89, 3449-51), such values were used in the study of fishery economics (see Appendix A) and were accepted by the Commission (R. 550).

Arguments to the effect that the Cowlitz River contributes at least 10 percent of the \$20,000,000 gross value claimed for the Columbia River fishery and that its defense against construction of power dams is essential to prevent the destruction of all fisheries in the Pacific Northwest (Pet. Br. 89-90) do not stand up under proper analysis. Each situation must be considered on its own merits. The Cowlitz Project would utilize the lowest site on the river and is the best power site in western Washington. Assuming the most pessimistic outcome possible, namely, that all of the fishery resources above Mayfield dam would be destroyed, in such an extreme case only about half of the Cowlitz River fishery would be lost (see Appendix A) and the economics would be decidedly in favor of construction of the Cowlitz

Project (see Appendix B). Certainly some of the fishery resources above Mayfield dam would be saved by means of hatcheries (see Appendix A). In addition, the City would provide and assume the annual cost of a multi-million-dollar fish-passing facility which would be a full-scale fishery laboratory. There is no evidence to show that the fish-passing facility would not work. Petitioners rely entirely upon unsupported opinions and judgments (Pet. Br. 90).

The Commission's findings and conclusions relating to the conservation of fishery resources are adequately supported

Petitioners contend that there is no substantial evidence to support the several findings and conclusions in the Opinion and Order of November 28, 1951, relating to the fishery resources of the Cowlitz River and the methods proposed for their conservation (Pet. Br. 24-26, 31, 90-105). Contrary to this contention, there is an abundance of substantial evidence in support of the Commission's action issuing the license. The Presiding Examiner and the Commission had the benefit of a detailed analysis of the record relating to the facilities proposed by the City to conserve the fishery resources of the Cowlitz River (R. 116) and substantially the same analysis is presented here as Appendix C. Even if all of the runs of anadromous fish, constituting about 50 percent of the Cowlitz fishery, were blocked from using the Cowlitz River above Mayfield dam, a sizeable proportion of each run could be maintained by a hatchery program (R. 2948-49, 3571, 3639; Ex. 25, pp. 11-12).

A. The proposed facilities for passing anadromous fish upstream past Mayfield and Mossyrock dams

The City would provide two means of passing anadromous fish upstream past the Mayfield and Mossyrock dams, namely, fish ladders and trapping and hauling facilities (see Appendix C). The ladder facilities at Bonneville dam pass anadromous fish successfully over a height of 67 feet (R. 3707-09). There are indications that the 88-foot ladders at McNary dam on Columbia River will even be better (R. 3707, 3709-13, 3723-25, 3746-47; Ex. 58, pp. 26-28). Fish ladders having heights of 185 feet and 325 feet as proposed by the City have never been constructed (Ex. 30, p. 3) and consequently there is no actual experience on which to base conclusions as to the success to be expected in their operation. No one knows to what height salmonoids will pass via ladders and any opinions thereon are purely conjectural. It is a commonly known physical fact that, insofar as energy is required for lift alone, a salmon in lifting itself a height of 185 feet expends the same amount of energy regardless of whether it does it by following the natural course of a river or by going up a fish ladder. However, additional energy is expended in moving against flowing water between two points, whether it be in a fish ladder and then a relatively still reservoir or in the natural river which has canyons and water flowing at high velocities (R. 961-963, 965, 971-972, 974, 3809). There is nothing to show that the fish which would ascend the ladders would expend substantially more energy than do the

fish which now migrate the same vertical distance in the natural river channel.

The anadromous fish that would use the proposed fish ladders at Mayfield and Mossyrock dams are, under natural conditions, at various stages of sexual maturity when they reach the spawning grounds. The spring chinooks are not near sexual maturity (R. 2950-51, 2955-56). The fall chinooks develop sexually on the migratory run and by the time they reach their bed they are normally about ready to spawn (R. 2956-59). The early run of silver salmon has some lay-over before spawning in the upper river (R. 2960-61, 3795; Ex. 25, p. 4) but the late run spawns shortly after it reaches its beds (R. 2960). The winter run steelhead is sexually mature and ready to spawn while the spring run and summer run steelhead are not near full sexual development (R. 3568). The sea-run cutthroat trout make several migrations and their sexual maturity for spawning is not critical (R. 3570). Thus the spring chinooks would be strong at the time they would reach the ladders at Mayfield and Mossyrock (Ex. 28, p. 14). The fall chinooks which spawn above the confluence of the Cispus with the Cowlitz would be fairly strong by the time they reach these ladders (Ex. 28, p. 12) but those spawning in the Mayfield and Mossyrock reservoirs and in Tilton River would be in an advanced stage of sexual maturity. The silver salmon spawning in the Cispus River would be fairly strong when they reached the ladders (Ex. 28, p. 10), while those spawning in Tilton River would be about ready to spawn but they would have to climb only the

Mayfield ladder. The steelhead and cutthroat trout eat while migrating and do not die after spawning (R. 3566-70); so they would have enough energy to climb the ladders. In view of the foregoing, the record does not support a rejection of the ladder system, in addition to which these particular ladders would provide an important research facility.

The trapping and hauling method of passing anadromous fish upstream is the best one known to date (R. 3660; Appendix C). Spring chinook and fall chinook would be trapped at Mayfield and released above Mossyrock (Ex. 28, pp. 12-15). Practically all of these chinook salmon spawn above Mossyrock dam. The early and late runs of silver salmon would also be trapped at Mayfield and released above Mossyrock (Ex. 28, pp. 10-11) and this method of passing fish upstream would affect adversely only about 14 percent of the silver salmon. By sample handling of silver salmon it may be possible to separate the Tilton fish from those above Mossyrock.

In both the fish ladder program and the trapping and hauling program a fish-tight rack would be provided. Petitioners' engineering witness testified that the construction of an adequate fish rack is entirely a matter of engineering (R. 3897). Such a fish rack can be built to operate satisfactorily (see Appendix C). Unsatisfactory experience in the past with fish racks resulting from poor design and inexperience in operation (R. 398-399; Ex. 35, p. 3; Appendix C) is no indication that a suitable fish rack cannot be constructed and placed in service. There is no evidence

to show that salmon migrate upstream at time of flood stage up to 40,000 cfs (R. 3696-97), but even under such conditions fish racks can be designed to stay in place. The Petitioners have refused to assist the City of Tacoma in the design of a fish rack (see Appendix E).

B. The proposed facilities for passing anadromous fish downstream past Mayfield and Mossyrock dams

The City proposes a new and untried system for gathering salmonoid and other anadromous fingerlings, adult steelhead and cutthroat trout, and lowering them down through Mossyrock dam and over Mayfield dam (R. 214-218; see Appendix C). While it cannot be stated as a fact that such facilities will not work, nor can it be said that they will work (R. 3661-62; Ex. 8, p. 1), nevertheless the plan certainly has excellent possibilities (R. 2238, 2271, 2273). No one questioned the mechanical features seriously. The component parts of the facilities for the lowering system have been analyzed and studied (R. 2237, 2401, 3763; see Appendix C), and improvements would naturally follow from the further tests, studies and experiments required by the license.

Petitioners' fishery experts gave testimony which shows that the effectiveness of the entrance ports in the upstream face of the Mossyrock dam to the upper collection system could be improved if they were enlarged so as to carry more water and if their location were to be moved to the ends of the dam (R. 3370, 3671-74, 3713, 4025-26). They also pointed out that the velocity of the water entering the ports

should be sufficient so that fingerlings could respond to the velocity while at some distance from the ports (R. 1570-71, 3125, 3662). The design of the system provides for control of flows over a wide range of velocities at the entrance to the ports (R. 4232, 4236-37, 4253).

The experts also made helpful suggestions with respect to the collection chamber (R. 1590, 3675-76) and with respect to the proposed screens at the bottom of the chamber (R. 1593-96, 3453-54, 3662-63, 3685, 3726, 4021). Attention was also given to improving the operating cycle and other features of the downstream passage system (R. 839, 849, 1529, 1538-41, 1697). Considerable knowledge has already been gained on the behavior of salmonoids under medium and high pressures of water (R. 1801-02, 3357-58, 3683, 4016-17, 4021-25), and this biological part of the problem does not raise any doubts; the fish can stand the pressures involved.

The design of the system would permit the operating cycle to be modified after construction to obtain best results (R. 1755, 1762-63). Petitioners' fishery experts have no basis for saying that the facilities proposed to pass migrants downstream will not work biologically (R. 2237-38, 2771, 3676). They urge that the method be tried at some existing dam. Unfortunately, such a trial at an existing dam is not practical for many reasons (R. 4257-60).

The problem of passing anadromous fingerlings and adults downstream by high dams must be solved if the anadromous fishery resource of the Pacific Northwest is to be saved (R. 2271-72, 3676). The fishery

experts have had since at least 1934 (R. 3632) to come up with an answer, but until the City came forward with its proposed plan none of the experts had presented a practical plan. The City offers to invest millions of dollars now to provide means of solving the problem (R. 4307, 4310-11, 4313). The City could not as a matter of good business assume such an expenditure if the proposed Cowlitz Project were not so attractive economically as a power development (see Appendix B). The Petitioners have not shown that they will ever have enough money to carry out, on their own, the required studies and experiments to perfect downstream-passing fishery facilities at high dams.

C. Other protective measures proposed for conservation of the fishery resources

A detailed account of the protective measures proposed by the City is set forth in Appendix C. The City proposes to ladder natural obstructions and falls and to conduct the operations of the power plants in such manner as to meet fishery needs (R. 4265-68). The City also proposes to screen the penstocks and to provide trash racks in front of the penstock screens (R. 854, 1577). The screen model tests conducted by the City and by Petitioners do not show what debris problem will be encountered on the Cowlitz. None of the Petitioners' experts has had any experience with screens over specially designed penstock openings at depths of 200 feet, shielded by trash racks, and their opinions have no substantial support. The maintenance of clean screens in deep water is an engineering problem and not a biological

one, and it would not be difficult (R. 1599). A large reservoir such as the Mossyrock would settle out the silt. Dams in service on other rivers have improved the downstream anadromous fishery. Although the existence of the proposed dams would block free movement of fingerlings, not one of Petitioners' witnesses knew how far fingerlings migrated for food (R. 2233, 2265), and any conclusions based on this factor are useless. The record shows that the experience with hatcheries has been quite good (R. 3461, 3927-36, 3958), and the City could contribute much toward conservation of the fishery resource by utilizing modern hatchery facilities. Obviously, if fish hatcheries were not successful, they would not be in such wide use in the western streams.

III

Petitioners have been and will be consulted on fisheries protection measures

As a final objection to the Commission's order issuing a license for the Cowlitz Project, Petitioners contend that the order is an unlawful extension of authority because it does not provide for the determination or adequate testing of the effectiveness of the fish protective devices; it provides for the management of State fishery resources by the City of Tacoma; and it purports to provide for further essential proceedings without opportunity for Petitioners to be heard (Pet. Br. 105-109).

If, as appears from the record, the Cowlitz Project is subject to the licensing provisions of the Federal Power Act, the Commission—not the Petitioners—

is charged with the responsibility for determining how these water resources may best be utilized in the public interest. As the Supreme Court said in the *Roanoke Rapids* case decided March 16, 1953 (73 S. Ct. at 619):

Judgment upon these conflicting engineering and economic issues is precisely that which the Commission exists to determine, so long as it cannot be said, as it cannot, that the judgment which it exercised had no basis in evidence and so was devoid of reason.

As a matter of fact, it is obvious from their petition and brief that Petitioners' real complaint is not that they have not been consulted and will not be consulted in the future, both by the City of Tacoma and the Commission, but that the Commission has not followed their advice.

If, contrary to the findings of the Commission, the facts before the Court should convince it that the proposed project could not be constructed without complete destruction of the fish runs, although no such conclusion is justified, then the Commission has not exercised good judgment. But, as the Eighth Circuit said in *State of Iowa v. Power Comm'n*, 178 F. 2d at 428, "the power of a court or an administrative agency to decide questions is not confined to deciding them correctly."

Moreover, in the instant case the Commission has taken every reasonable precaution to see that the fishery resources are protected to the fullest extent possible, even requiring substantial expenditures for that purpose. As State officers concerned primarily

with fish and wildlife conservation, the Petitioners have been consulted by the Commission as well as by its licensee, the City of Tacoma. Indeed, since the order of November 28, 1951, the City has endeavored to carry on the research required by the Commission and has requested the Secretary of the Interior, the United States Fish and Wildlife Service, and the Petitioners, as the official agents of the State of Washington, to cooperate in essential research on these problems. We attach in Appendix E recent correspondence showing the lack of progress in further research on the fishery protection problems because the Secretary of the Interior and the State agencies refuse to cooperate with the City.

Finally, Petitioners' complaint that the Commission's order provides for approval of final plans for fish facilities without giving them an opportunity to be heard is without merit. Article 30 of the license (R. 559) specifically requires the City to consult with Petitioners in preparing final plans and Petitioners have every opportunity under this cooperative procedure to advise and consult with the Commission in event of disagreement as to the probable effectiveness of the proposed fish facilities.

CONCLUSION

The order of the Commission here under review was issued under the authority of the Federal Power Act in conformity with the standards prescribed by Congress, and was based upon substantial evidence

of record. For the reasons set forth herein, the order of the Commission should be affirmed.

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APRIL 1953.

APPENDIX

Appendices A, B, and C are analyses of the evidence of record relating to the fishery conservation program and the economics of the Cowlitz Project. Substantially the same analyses on these subjects were included in briefs of Commission Staff Counsel in the proceeding before the Presiding Examiner and the Commission.

APPENDIX A

THE ECONOMICS OF THE FISHERY RESOURCES IN RELATION TO THE CONSERVATION PROGRAM PROPOSED BY THE CITY OF TACOMA

As part of its Cowlitz Project, the City of Tacoma proposes to provide certain fishery facilities and improvements in an effort to offset certain claimed adverse effects of the Mayfield and Mossyrock dams on the fishery resources of the Cowlitz watershed (R. 1291, 1396, 1444-47, 1457-58). The costs of such improvements and facilities would be borne by the City and are considered here in relation to the estimated values of the fishery resources in order to set forth the comparative economics of this phase of the project.

In the analysis of the economics set forth herein there have been utilized the estimates of quantities, unit prices, values, and other data presented through the Petitioners' witnesses unless otherwise indicated. Assumptions and estimates were made only to the extent necessary to complete the analysis.

THE GROSS VALUE OF THE FISHERY RESOURCES OF THE COWLITZ RIVER

Testimony and exhibits were presented on the gross value of part of the fishery resources of the Cowlitz River. This gross value is presented in terms of the commercial catch and the catch by sportsmen (Ex. 25, pp. 7, 8; Ex. 28, pp. 6, 7). The procedure is to assign to the commercial catch a unit price per pound for each type of fish and to compute the total dollar value by summation, and to the sports catch a total dollar value is assigned to each type of fish evaluated and a sum is obtained (Ex. 25, pp. 7, 8; Ex. 28, pp. 6, 7). The totals for commercial catch and for the sportsmen's catch are added to give the gross value of the fishery resources of the Cowlitz River.

The Amount of Commercial and Sports Fish Catch Attributed to the Cowlitz River.—The commercial catch portion of

salmon and anadromous trout produced by the Cowlitz River watershed is taken in the Columbia River and in the Pacific Ocean (R. 3960-62; Exs. 25, 28). As fish from the Cowlitz are not distinguishable from like fish produced in other rivers, it is not possible to state precisely just how many are produced by the Cowlitz River watershed. Therefore, it was necessary for Petitioners to make a judgment estimate for the approximations of the number of fish of each type produced there (R. 3258-61, 3693-94, 3959-61; Ex. 25).

It was estimated by Petitioners that the Cowlitz River watershed above the Mayfield Dam site produces 249,933 salmon and anadromous trout annually (Ex. 28, p. 6, Table I). Of this number, 85,261 are spawning fish. Thus the difference of 164,672 represents cropped fish weighing 1,825,048 pounds (Ex. 28, p. 6, Table II). By applying the same commercial catch and sports catch ratios to the spawning escapement (Ex. 25), the whole Cowlitz River watershed is estimated to produce about 390,000 salmon and anadromous trout of which about 129,000 are spawning fish. The remainder of 261,000 represents cropped fish weighing approximately 3,070,000 pounds. The difference between 3,070,000 and 1,825,048, namely, 1,244,952, represents weight of the salmon and anadromous fish produced below Mayfield.

In addition, the Cowlitz River below Mayfield produces all of the smelt of the Cowlitz watershed, averaging about 1,500,000 pounds per year (R. 3809).

Thus the Cowlitz River below Mayfield produces about 2,745,000 pounds of fish compared to 1,825,048 pounds of fish produced above Mayfield, on an annual basis.

The increased spawning area due to the requirement that the city maintain a minimum flow of 2,000 c. f. s. rather than 1,090 c. f. s. (average minimum flow) has not been determined (R. 3832-33) but such increased spawning area would increase the amount of fish attributable to the Cowlitz River watershed below Mayfield, according to Petitioners (R. 3963).

The Unit Gross Value of Commercial Fish Catch Attributed to the Cowlitz River.—For purposes of estimating the gross commercial value of salmon and anadromous trout attributed to the Cowlitz River watershed, witnesses for Petitioners used

prices per pound of fish which varied with location of catch, its condition, and type of fish (R. 3960-63; Ex. 28, p. 7, Table IV). The unit prices used represent wholesale commercial values computed from the average prices paid by retailers to wholesalers for their products. These are fresh fish prices and are based on those for the season of 1950 (R. 3356-57). The prices used for outside troll catch are for fish caught, landed and dressed, while those for Columbia River fish are as caught before anything is done (R. 3961).

For the outside troll catch the following prices in cents per pound were used:

- 55 for spring chinook.
- 47 for fall chinook.
- 46 for silvers.

For the Columbia River catch the cents-per-pound prices used are:

- 51 for spring chinook.
- 43 for fall chinook.
- 42 for silvers.
- 35 for steelhead.

These prices are about as high as they have ever been (R. 3555-56; Ex. 28, p. 7, Table IV).

The wholesale value of smelt is about 10 cents per pound and this unit price is applicable to the commercial catch (R. 2972).

The Annual Gross Value of Commercial Fish Catch.—The gross commercial value of salmon and sea-run trout produced by the Cowlitz River above Mayfield, representing wholesale prices paid by retailers to wholesalers for fresh fish, was estimated at \$341,196 for the outside troll catch and \$421,289 for the Columbia River catch, the total gross value being \$762,485 (Ex. 28, p. 7, Table IV).

The gross commercial value of salmon and sea-run trout produced by the whole Cowlitz River is estimated at \$554,322 for the outside troll catch and \$704,183 for the Columbia River catch, the total value being \$1,258,505. These gross values for the whole Cowlitz River are based on the following annual numbers of fish as estimated from the ratios used in Exhibits 25 and 28:

Spawning escapement:	<i>Species</i>	<i>Number of fish</i>
	Spring chinook.....	10, 395
	Fall chinook.....	30, 983
	Silvers.....	32, 088
	Steelhead.....	16, 923
	Cutthroat.....	38, 247
Outside troll catch:		
	Spring chinook.....	13, 929
	Fall chinook.....	50, 812
	Silvers.....	32, 088
Columbia River catch:		
	Spring chinook.....	11, 954
	Fall chinook.....	51, 121
	Silvers.....	36, 901
	Steelhead.....	4, 615

By applying the same average weights as used in Exhibit 28, the following annual pounds of salmon and trout were estimated to be produced by the whole Cowlitz River:

Outside troll catch:	<i>Species</i>	<i>Number of pounds</i>
	Spring chinook.....	208, 935
	Fall chinook.....	762, 180
	Silvers.....	176, 484
Columbia River catch:		
	Spring chinook.....	200, 827
	Fall chinook.....	1, 073, 541
	Silvers.....	295, 208
	Steelhead.....	46, 150

By using the same average prices per pound as given in Exhibit 28 (p. 7, Table IV), the total amount of \$1,258,505 was obtained as an estimate of the gross value of salmon and trout for the Cowlitz River watershed.

The gross value of salmon and trout produced by Cowlitz River below Mayfield is \$496,020 as obtained by subtracting the gross value above Mayfield (\$762,485) from the gross value for the whole Cowlitz River (\$1,258,505).

The gross average value of smelt, which is produced only below Mayfield, is estimated at \$150,000 based on an average annual commercial catch of 1,500,000 pounds and a unit value of 10 cents per pound.

The estimated annual gross value of anadromous fish produced commercially on the Cowlitz River below Mayfield is equal to the sum of \$496,020 and \$150,000, which is \$646,020,

and for the section of river above Mayfield the estimate is \$762,485, as previously set forth herein.

The Annual Gross Value of Sportsmen's Fish Catch.—The estimated gross value of the sportsmen's catch presented in Exhibit 28 (p. 7, Table IV) for fish produced in the Cowlitz River above Mayfield is \$433,146. This is the sum of \$42,769 for 18,144 pounds of spring chinook, \$59,670 for 74,592 pounds of fall chinook, \$18,480 for 11,200 pounds of silvers, \$229,356 for 80,000 pounds of steelhead, and \$82,872 for 18,645 pounds of cutthroat trout (Ex. 28, pp. 6, 7). From these figures it is readily computed that \$2.36 per pound was used by Petitioners to evaluate the sportsmen's catch of spring chinook, \$0.80 for fall chinook, \$1.65 for silvers, \$2.87 for steelhead, and \$4.44 for cutthroat trout.

The unit prices for fish as used for sports catch represent the average cost to sportsmen of catching the fish and getting the recreation that goes with the catching of fish (R. 3387-88). The gross value of fish to sportsmen, exclusive of the recreational value, may be reasonably approximated by applying the commercial Columbia River catch unit prices (Ex. 28, p. 7, Table IV) plus 5 cents a pound to account for value beyond the wholesaler so as to approximate retail prices to sportsmen if purchases were made at a market. On this basis, the sports catch would have the following values:

Species	Pounds	Rate per pound	Amount
		<i>Cents</i>	
Spring chinook.....	18,144	56	\$10,160
Fall chinook.....	74,592	48	35,804
Silvers.....	11,200	47	5,264
Steelhead.....	80,000	40	32,000
Cutthroat.....	18,645	40	7,458
Total.....			90,686

By summation, the gross fish value (exclusive of recreational value) of the sportsmen's catch of salmon and anadromous trout produced in the Cowlitz River above Mayfield becomes \$90,686. As the gross value for the sports catch of salmon and trout and for recreation attributable to those fish in the Cowlitz River above Mayfield is \$433,146 per year, then the

recreational value alone attributable to those fish is \$342,460 (\$433,146 less \$90,686).

If the Mayfield and Mossyrock dams are built, the reservoirs created thereby will afford recreational opportunities which will have considerable annual recreational value. Based on experience at other reservoirs in the West and in the Northwestern Region, it is reasonable to expect that annual recreational values attributable to the created reservoirs will offset to a great extent, and may even exceed, the \$342,460 recreational value attributable to sports fishing for fish produced above Mayfield.

Based on data presented in Exhibit 25, an estimate was made of the sportsmen's catch in numbers and pounds for the whole Cowlitz River watershed as follows:

Species	Number	Pounds
Spring chinook.....	1, 440	24, 192
Fall chinook.....	5, 272	110, 712
Silvers.....	2, 216	17, 728
Steelhead.....	12, 308	123, 080
Cutthroat.....	38, 247	28, 685

By multiplying the annual poundage of sports fish by the average unit prices for both fish and recreation used in Exhibit 28 (p. 7, Table IV), the following gross values attributable to the whole Cowlitz River for salmon and trout for both fish and recreation were computed:

Spring chinook.....	\$57, 020
Fall chinook.....	88, 570
Silvers.....	33, 029
Steelhead.....	353, 240
Cutthroat.....	127, 648
Total	\$659, 507

Next, the gross fish value of salmon and trout (exclusive of recreational value) was computed to be:

Spring chinook (24,192 pounds at 56 cents).....	\$13, 547
Fall chinook (110,712 pounds at 48 cents).....	53, 141
Silvers (17,728 pounds at 47 cents).....	8, 332
Steelhead (123,080 pounds at 40 cents).....	49, 232
Cutthroat (28,685 pounds at 40 cents).....	11, 474
Total	\$135, 726

The total gross fish value for salmon and sea-run trout sports catch (exclusive of recreational value) produced by the entire Cowlitz River is thus estimated to be \$135,726. Therefore the recreational value attributed to salmon and trout sports catch on the whole Cowlitz River is estimated to be \$523,781 (\$659,507 less \$135,726).

The total gross fish value (exclusive of recreational value) of salmon and sea-run trout of the sports catch attributable to the Cowlitz River below Mayfield is estimated at \$45,040 (\$135,726 less \$90,686). The recreational value of the salmon and sea-run trout sports catch produced on the Cowlitz River watershed below Mayfield is estimated to be \$181,321 (\$523,781 less \$342,460).

In addition there is an extensive sports fishery for smelt on the Cowlitz River below Mayfield. In one day as many as a thousand people caught about their limit of 20 pounds and when the smelt are in the river in good numbers virtually everybody gets his limit. The runs of smelt extend from November to March (R. 2972-73, 3809-10; Ex. 59, p. 162). On the basis of this evidence it is estimated that there is an average sports catch of 10,000 pounds per day over a two-month period, totaling 600,000 pounds of sports smelt catch per season. Using a gross fish value of 10 cents per pound, the fish value of the sports catch of smelt is estimated at \$60,000. Using a recreational value of 20 cents a pound of smelt, the recreational value of sports smelt fishing would be \$120,000.

The total gross fish value (exclusive of recreational value) of the salmon, sea-run trout and smelt of the sports catch attributable to the Cowlitz River below Mayfield is estimated at \$105,040 (\$45,040 plus \$60,000). The recreational value of the salmon, sea-run trout and smelt catch of the Cowlitz River below Mayfield is estimated at \$301,321 (\$181,321 plus \$120,000).

The Annual Gross Value of Total Fish Catch Attributable to the Cowlitz River.—The gross value of the total fish catch attributable to the Cowlitz River watershed is equal to the sum of (1) the gross value of the commercial catch of salmon, sea-run trout and smelt; (2) the gross fish value (exclusive of recreational value) of the sportsmen's catch of salmon, sea-

run trout and smelt; and (3) the recreational value of the sportsmen's catch of salmon, sea-run trout and smelt.

The gross value of the total fish catch attributable to the Cowlitz River above Mayfield is estimated at \$1,024,401 [\$762,485 (gross commercial value) plus \$90,686 (gross fish value of sports catch) plus one-half of \$342,460 (recreational value of sports catch) or \$171,230]. Similarly, the gross value of the total fish catch attributable to the Cowlitz River below Mayfield is estimated at \$1,052,381 [\$646,020 (gross commercial value) plus \$105,040 (gross fish value of sports catch) plus \$301,321 (recreational value of sports catch)]. In the estimates for the Cowlitz above Mayfield it is assumed that only one-half of the fishery recreational value would be offset by the reservoir recreational value, even though it is expected that the offset would be equal to or in excess of the \$342,460 estimated as the recreational value of the sports catch above Mayfield. The gross value of the total fish catch for the Cowlitz River, including recreational value of sports catch, is estimated at \$2,076,782. Of course, these figures do not include the value of Cowlitz River smelt caught in the Columbia River (R. 2973-74) or the value of fish to be produced by increased spawning areas due to increased flows below Mayfield nor do they include any reductions for spawning areas drowned out by reservoirs.

Conclusion.—On the Cowlitz River watershed, the total gross value due to fish attributable to the area above Mayfield is equal to that below Mayfield, in each case being slightly in excess of \$1,000,000.

THE NET VALUE OF THE FISHERY RESOURCES OF THE COWLITZ RIVER

The net value of the fishery resources of the Cowlitz River watershed is equal to the sum of (1) the net value of the commercial catch, (2) the net fish value of the sportsmen's catch, and (3) the recreational value of the sportsmen's catch. For our purposes, the Petitioners' estimates of net value as presented in Exhibit 28 have been utilized although it might be argued that the estimates represent more than actual net value. Such values are presented here for the whole Cowlitz

River basin and for the portions thereof above and below Mayfield. As was done in the preceding part on gross values, estimates were made using the procedures and methods set forth in Exhibits 25 and 28.

The Annual Net Value of the Commercial Catch.—The annual net value of the commercial catch of salmon and sea-run trout above Mayfield is estimated to be \$464,346, being made up of \$252,449 for outside troll catch and \$211,897 for Columbia River catch (Ex. 28, p. 7, Table III).

The annual net value of the commercial catch of salmon and sea-run trout for the whole Cowlitz River watershed, using poundage figures developed in the preceding part hereof, is computed as follows:

Species	Pounds	Rate per pound	Amount
Outside troll catch:		<i>Cents</i>	
Spring chinook.....	208,935	41	\$85,663
Fall chinook.....	762,180	35	266,763
Silvers.....	176,484	33	58,240
Columbia River catch:			
Spring chinook.....	200,827	25	50,207
Fall chinook.....	1,073,541	21	225,444
Silvers.....	295,208	23	67,898
Steelhead.....	46,150	18	8,307
Total.....			762,522

The annual net value of the commercial catch of salmon and sea-run trout attributable to the Cowlitz River below Mayfield is estimated at \$298,176 (\$762,522 less \$464,346). In addition, the average annual net commercial value of smelt produced below Mayfield is estimated at \$90,000 (1,500,000 pounds at 6 cents per pound). Thus, the annual net value of the commercial catch of salmon, sea-run trout and smelt attributable to the Cowlitz River below Mayfield is estimated at \$388,176 (\$298,176 plus \$90,000).

The Annual Net Value of the Sportsmen's Catch.—The annual net value of the sportsmen's catch of salmon and sea-run trout produced by the Cowlitz River above Mayfield has been estimated at \$202,581 (Ex. 28, p. 7, Table III). This value is based on a unit price figure of \$1.00 per pound applied to the sportsmen's catch (Ex. 28, p. 6, Table II).

This total of \$202,581 is too high because it includes an amount for fall chinook of \$74,592 as net value, while the gross value, based on Petitioners' evidence, is only estimated at \$59,670 (Ex. 28, p. 7, Tables III, IV). However, in the estimates presented here no correction is made.

This annual value of \$202,581 represents a fish value and a recreational value (R. 3388). The net fish value (exclusive of recreational value) of the sportsmen's catch of salmon and sea-run trout produced above Mayfield, when estimated at the same price as Columbia River catch plus 5 cents for retailers' differential, is computed to be:

Spring chinook (18,144 pounds at 30 cents)-----	\$5, 443
Fall chinook (74,592 pounds at 26 cents)-----	19, 394
Silvers (11,200 pounds at 28 cents)-----	3, 136
Steelhead (80,000 pounds at 23 cents)-----	18, 400
Cutthroat (18,645 pounds at 23 cents)-----	4, 288
Total -----	50, 661

The net recreational value of the sports catch produced above Mayfield is computed to be \$151,920 (\$202,581 less \$50,661).

The annual net value (fish value plus recreational value) of the sportsmen's catch of salmon and sea-run trout produced by the whole Cowlitz River watershed, based on one dollar per pound, is estimated at:

Spring chinook-----	\$24, 192
Fall chinook-----	110, 712
Silvers-----	17, 728
Steelhead-----	123, 080
Cutthroat-----	28, 685
Total -----	304, 397

The annual net fish value (exclusive of recreational value) of the sportsmen's catch produced by the whole Cowlitz River when estimated at the Columbia River catch unit prices, plus 5 cents for retailers' differential, is estimated at:

Spring chinook (24,192 pounds at 30 cents)-----	\$7, 258
Fall chinook (110,712 pounds at 26 cents)-----	28, 785
Silvers (17,728 pounds at 28 cents)-----	4, 964
Steelhead (123,080 pounds at 23 cents)-----	28, 308
Cutthroat (28,685 pounds at 23 cents)-----	6, 598
Total -----	75, 913

The annual net recreational value of the sports catch produced by the whole Cowlitz River is then computed to be \$228,484 (\$304,397 less \$75,913).

The annual net fish value (exclusive of recreational value) of the sportsmen's catch of salmon and sea-run trout attributable to the Cowlitz River below Mayfield is estimated to be \$25,252 (\$75,913 less \$50,661). The annual net recreational value of the sportsmen's catch of salmon and sea-run trout attributable to the Cowlitz River watershed below Mayfield is estimated at \$76,564 (\$228,484 less \$151,920). The annual net fish value (exclusive of recreational value) of the catch by sportsmen of smelt produced by the Cowlitz River below Mayfield is estimated at \$30,000 (600,000 pounds at 5 cents) and the annual net recreational value is estimated at \$60,000 (600,000 pounds at 10 cents per pound). The annual net fish value (exclusive of recreational value) of the sportsmen's catch of salmon, sea-run trout, and smelt produced on the Cowlitz River watershed below Mayfield is estimated at \$55,252 (\$25,252 plus \$30,000). The annual net recreational value of the sportsmen's catch of salmon, sea-run trout, and smelt produced below Mayfield is estimated at \$136,564 (\$76,564 plus \$60,000).

The Net Value of Fish Catch Attributable to the Cowlitz River.—The net value of the fish catch attributable to the portion of the Cowlitz River watershed above Mayfield is estimated by components as follows: commercial catch of salmon and sea-run trout, \$464,346; sportsmen's catch of salmon and sea-run trout—fish value, \$50,661; and sportsmen's catch of salmon and sea-run trout—recreational value, \$75,960 (one-half of \$151,920); the total being \$590,967. Although for purposes of these computations one-half of the recreational fish value is offset by the recreational value of the Mayfield and Mossyrock reservoirs, it is expected that the annual net value of the reservoirs will equal or exceed the \$151,920 estimated as the recreational value attributed to salmon and trout sports catch above Mayfield. Exclusive of recreational value, the net fish value is estimate to be \$515,007.

The net value of the fish catch attributable to the portion of the Cowlitz River watershed below Mayfield is estimated by components as follows: commercial catch of salmon, sea-run

trout and smelt, \$388,176; sportsmen's catch of salmon, sea-run trout and smelt—fish value, \$55,252; and sportsmen's catch of salmon, sea-run trout and smelt—recreational value, \$136,564; the total being \$579,992. Exclusive of recreational value, the net fish value is estimated at \$443,428.

The net value of fish catch attributable to the whole Cowlitz River watershed is estimated at \$1,170,959 (\$590,967 plus \$579,992). This figure includes no allowance for Cowlitz River smelt caught in the Columbia River and no allowance for additional fish production because of increased minimum regulated flows, nor does it include adjustments for spawning area covered by the Mayfield and Mossyrock reservoirs.

Conclusion.—The annual net value due to the fish attributable to the area above Mayfield is about equal to that below Mayfield, in each case being slightly less than \$600,000. The annual net value due to fish exclusive of recreational value is estimated to be about \$515,000 above Mayfield and \$445,000 below Mayfield.

THE ESTIMATED COST OF THE FISHERY RESOURCE CONSERVATION PROGRAM

The City has proposed to provide certain fish passing facilities at Mayfield and Mossyrock dams, fish hatchery facilities and stream improvements to assist in conserving the fishery resources of the Cowlitz River should the Mayfield and Mossyrock developments be constructed. In connection with such fishery facilities and stream improvements, there would be required the incurring of investment costs and operation and maintenance costs.

The Investment Cost of Fish Passing Facilities Proposed at the Mayfield and Mossyrock Sites.—The estimated investment cost for fish passing facilities proposed by the City is \$7,100,000 (R. 788). Of this total, \$3,100,000 represents the cost of fish handling facilities at Mayfield and \$4,000,000 at Mossyrock (Item A, Revised Ex. N, p. N-23).

Based on cost estimates included in revised Exhibit N in the application for license (Item A), the estimated investment cost of the fish ladder at Mayfield, including a flume under

the draft tube deck of the powerhouse, is \$769,000 (\$599,000 direct cost plus 28.4 percent for overhead and contingencies).

At Mossyrock, the estimated capital cost of the fish ladder is \$1,290,000 (\$1,005,000 direct cost plus 28.4 percent for overhead and contingencies).

Thus, based on estimates by the City, of the total investment cost of \$7,100,000 for fish passing facilities, \$2,059,000 would be for fish ladders and \$5,041,000 for other fish passing facilities.

Although the City also proposed the provision for trapping and hauling of fish (R. 4311, 4313), no estimate of the capital cost of such facilities has been made. For purposes of giving some dollar consideration, an approximate figure of \$1,000,000 has been assumed, based on an exhibit in the record (Ex. 25, p. 14). There is some question as to whether fish ladders should be provided for use in upstream migration of salmonoids and sea-run trout in view of the success of fish trapping and hauling procedures now developed (R. 3746). If not required for downstream migration, fish ladders might well be eliminated from the fish passing facility program. However, for purposes of a cost approximation they are retained in the program for this analysis.

Thus, the estimated investment cost for all fish passing facilities would be \$8,100,000.

The Annual Cost for Operation and Maintenance of Fish Passing Facilities Proposed at Mayfield and Mossyrock Sites.—No estimates have been presented by the City of the annual cost for operation and maintenance of its proposed fish passing facilities (R. 1676-77). For purposes of having some idea of costs, an estimate was made. The annual operating and maintenance costs thus estimated are as follows:

Fish ladders.....	\$15, 000
Fish trapping and hauling facilities.....	60, 000
Downstream fish passing facilities.....	80, 000
	<hr/>
Total.....	155, 000

The Investment Cost of Fish Hatching Facilities.—The City proposes to construct such fish hatcheries as may be reasonably necessary (R. 4307, 4313). No estimate of the investment cost has been made of fish hatching facilities. For our purposes,

an amount of \$1,300,000 was used, based on an exhibit in the record (Ex. 25, p. 15).

The Annual Operating Cost of Hatchery Facilities.—No estimate was made of the annual cost for operating and maintaining the hatchery facilities which may be constructed as part of the Cowlitz River fish resource conservation program (R. 1690). To have a figure for this element of cost, an amount of \$170,000 based on an exhibit in the record, has been used (R. 1447; Ex. 25, pp. 14, 15).

The Investment and Annual Operating Costs of Fish Laddering at Natural Falls and Obstructions.—The City stated that it would provide ladder facilities at natural falls and other obstructions as part of its comprehensive fishery plan (R. 4313, 4323, 4384), but no cost estimates therefor have been made. An investment cost of \$60,000, based on an exhibit in the record, has been used for this item (Ex. 31, p. 16) to cover 6 ladders. It is expected that annual operating costs would be very small and \$1,000 has been used therefor.

The Investment Costs for Stream Improvement for Removal of Obstructions and Pool Pockets.—The City's comprehensive fishery plan includes the matter of stream improvements (R. 4313, 4323, 4384). Based on an exhibit in the record, an investment cost for this feature of the plan of \$5,000 is being used herein (Ex. 31, p. 16).

Total Investment and Annual Costs of Fishery Resource Conservation Program.—The total of the foregoing costs of the Cowlitz River fishery resource conservation program is summarized here:

Item	Investment cost	Annual cost of operation and maintenance
Ladders.....	\$2,059,000	\$15,000
Other facilities.....	5,041,000	80,000
Trapping and hauling.....	1,000,000	60,000
Fish passing facilities.....	8,100,000	155,000
Fish hatchery facilities.....	1,300,000	170,000
Fish laddering facilities.....	60,000	1,000
Stream improvement.....	5,000	0
Total.....	9,465,000	326,000

If 3 percent is used to cover the cost of interest and depreciation on the investment in the fishery facilities, the annual fixed charges on the total investment would be \$284,000. The total annual cost of the fishery resource conservation program would be \$610,000 (\$326,000 for O. & M. plus and \$284,000 fixed charges). Admittedly, until the fishery resource conservation program is set forth in detail, and this has not been done to date, the amount of \$610,000 is nothing more than a rough figure subject to change. Nevertheless, it is sufficiently close to the total amount claimed as the net value due to fish produced in the Cowlitz River above Mayfield to make it particularly desirable to pursue further the fishery resource conservation program.

Conclusion.—The investment cost of facilities and improvements for a fishery resource conservation program is estimated at \$9,465,000. The annual cost of operating and maintaining such facilities and improvements plus the fixed charges on the investment is estimated at \$610,000.

SUMMARY OF VALUES AND COSTS, COWLITZ RIVER FISHERY

The gross fish value plus the gross recreational value due to the fishery resource of the whole Cowlitz River watershed is estimated at about \$2,000,000. About one-half (\$1,000,000) is attributable to the portion of the watershed above Mayfield and the other half (\$1,000,000) to that below Mayfield.

The net fish value (exclusive of recreational value) due to the fishery resource of the whole Cowlitz River watershed is estimated at about \$958,435. Of this amount \$515,007 is attributable to the portion of the watershed above Mayfield and \$443,428 to that below Mayfield.

The net recreational value due to the fishery resource of the whole Cowlitz watershed is estimated at \$212,524. Of this total, \$75,960 is attributable to the portion above Mayfield and \$136,564 to the portion below Mayfield. If the project is constructed, the loss in the recreational value attributable to fish in the natural watershed above Mayfield may be offset entirely by the gain in the recreational value due to the presence of the two reservoirs.

The net fish value plus the net recreation value due to the fishery resource of the whole Cowlitz watershed is estimated at \$1,170,959. About one-half (\$590,967) is attributable to the portion of the watershed above Mayfield and the other half (\$579,992) to that below Mayfield.

The investment cost for facilities and improvements for the suggested Cowlitz River fishery resource conservation program is estimated roughly at \$9,465,000. The associated total annual cost of this program is estimated roughly at \$610,000.

APPENDIX B

THE ECONOMIC FEASIBILITY OF THE COWLITZ PROJECT

The Cowlitz Project would be economically feasible if it is shown to be financially feasible and if the total dollar benefits due to the project exceed the total of the costs of the project plus the losses, if any, resulting from the project.

FINANCIAL FEASIBILITY

The financial feasibility of the Cowlitz Project would be determined by the amount of money that the City could borrow, service and retire in a reasonable time, at a reasonably satisfactory interest cost (R. 1448-49). The investment cost of the project facilities proposed for the Cowlitz Project, except those relating to fish conservation, is estimated at about \$135,000,000 (R. 4109-10). This cost may be reduced to about \$130,000,000 by use of an arch gravity dam in lieu of the type originally proposed (R. 787-788; Ex. 10, p. 6). As the City could finance a debt of \$142,000,000 over a reasonable period of time (Tr. 316, Ex. 12), there may be a margin of as much as \$12,000,000 available for investment cost in fishery facilities and improvements. In view of this situation there should not be any difficulty in financing an investment cost of \$9,465,000 for fishery facilities and improvements. It follows, therefore, that the financial feasibility of the entire Cowlitz Project is established provided that further studies and detailing of fishery facilities do not substantially increase the estimated investment costs for fishery facilities and improvements.

COMPARISON OF DOLLAR VALUES AND COSTS OF THE COWLITZ PROJECT

The record shows that the annual value of the power output of the Cowlitz Project would exceed the cost of production by \$1,700,000 (R. 4114-17).

If no facilities or improvements whatsoever were made at the Mayfield and Mossyrock developments or elsewhere to conserve the fishery resource of the Cowlitz River watershed above Mayfield, the estimated net value of the loss of fish and recreation associated therewith would be \$515,007 for fish plus \$75,960 for fishery recreation, making a total of \$590,967. On this basis, the annual net benefits of the Cowlitz Project would be \$1,109,000 in excess of project costs and fish losses [\$1,700,000 (net power value) less \$590,967 (net value of fish and recreational loss)] and the project would be economically feasible.

On the basis of a fishery resource conservation program at the estimated cost as herein developed, the economic picture would be somewhat as follows. Annual power benefits in excess of costs are estimated at \$1,700,000. The annual cost of a fishery program is estimated at \$610,000. Assuming one-half of the fishery resource above Mayfield is saved, the estimated net value of that portion which would be lost would be about \$300,000. On this basis the annual net benefits of the Cowlitz Project would be \$790,000 in excess of costs and fish losses (\$1,700,000 power value, less \$610,000 fish facilities operating cost, less \$300,000 fish loss). Assuming that no fish above Mayfield are saved by the fishery resource conservation program, the annual net benefits of the Cowlitz Project would be \$499,033 (\$1,700,000 power value, less \$610,000 fish facilities operating cost, less \$590,967 fish loss).

CONCLUSION

Based on presently available cost data in the record and on the estimates made to roughly approximate other costs, the Cowlitz Project is indicated to be financially and economically feasible.

APPENDIX C

THE PLAN PROPOSED BY THE CITY OF TACOMA FOR CONSERVING THE FISHERY RESOURCES OF THE COWLITZ RIVER

HANDLING UPSTREAM MIGRANTS DURING CONSTRUCTION PERIOD

During the period of construction the City of Tacoma proposes to pass the upstream migrants through a diversion tunnel at each of the Mayfield and Mossyrock dams. The diversion tunnels at Mayfield and Mossyrock dams will be 460 feet long and 1510 feet long, respectively (Ex. 11).

During the construction of Mayfield dam the natural stream will be unwatered for a period of only three to four months, i. e. July to October, when the flows are normally low. The tunnel will be designed so that it will be only partially full of water during normal summer flows and velocities will be low enough for passage of upstream migrants (Exs. 11, 63; R. 3734). During the period of filling the Mayfield reservoir the City plans to pump water into the fish ladders to attract fish into them, trap the fish and haul them above the dam (Exs. 11, 14). The record indicates that the problem of handling upstream migratory fish during construction of Mayfield dam can be satisfactorily solved.

During the construction of Mossyrock dam the problem of handling upstream migrants is a more serious one. The diversion tunnel is much longer and the river will be blocked for a period of about 18 months (Ex. 11). The upstream migrants should have no difficulty passing through the velocities in this tunnel during periods of normal flow (Exs. 11, 63; R. 3734-35). However, the particular objection of the Petitioners is the distance to be traveled in darkness without resting pools and the excessive currents during periods of high flow. Witness Barnaby of the Fish and Wilflife Service testified for Petitioners that the velocity in the Mossyrock tunnel should not exceed 3 feet per second (R. 3734-35). Exhibit 63 shows that flows with velocities of less than 3 feet per second will pre-

vail at the edges of the tunnel when as much as 10,000 cubic feet per second is passing through the tunnel. This flow is exceeded only about 7 percent of the time (Ex. 14, p. 37). If further tests show the desirability of lighting the tunnels, there appears to be no engineering reason why this cannot be done.

During periods of flow in excess of 10,000 c. f. s., and during the period of filling the reservoir the City plans to utilize the fish ladders so as to attract the upstream migrants to a point where they can be trapped and hauled above the dam. It cannot be determined from the record to what extent the upstream migrants will use the Mossyrock diversion tunnel. However, the method of trapping and hauling should produce satisfactory results (Ex. 59, pp. 7, 17; Ex. 32, p. 47).

UPSTREAM FISH PASSING FACILITIES FOR USE DURING THE OPERATING PERIOD

The City proposes to construct fish ladders at the Mayfield and Mossyrock dams for passing the upstream migrants from tailwater to headwater. The ladder at Mayfield would be 185 feet in height and the one at Mossyrock 325 feet in height.

The facilities at the Mayfield site contemplate a collecting flume across the front of the powerhouse with an opening to the fishway at each end of the powerhouse, with sufficient velocity discharge for the attraction of fish. A fish barrier will be located immediately above the powerhouse to prevent fish from ascending the stream above the powerhouse and to divert the fish into the collection system of the fishways. The fish ladders will consist of a series of pools each one foot in elevation above the preceding one, and are four or five feet deep, with a weir at the lower end, with one foot of water flowing over the top. The pools are each about 16 feet long. Resting pools are also proposed at various points in the ladders (Ex. 14).

The facilities at Mossyrock dam contemplate a fish barrier located at the upstream end of the powerhouse for the purpose of diverting fish into a fish ladder of similar design as the one at Mayfield. Sufficient velocity discharge will be provided at the entrance to the fishway for attraction of fish. In order for the fish to enter the Mossyrock reservoir at various pool

elevations (maximum drawdown 100 feet) the City contemplates, as one method, five passageways or tunnels running partially filled through the upper portion of the dam at each 25-foot elevation above elevation 650 so that the maximum distance of passing the upstream migrants down into the reservoir by means of a smooth, watered chute would vary from zero to twenty-five feet (Ex. 19; R. 860-864, 4014-15).

If the ladder method of handling upstream migrants is not considered desirable, the City contemplates other alternate methods such as trapping and hauling, similar to the installation made by the Corps of Engineers at Mud Mountain dam, Washington, or a combination of ladders and hoist (Ex. 14, p. 13). Fish locks, such as are proposed at McNary dam, might also be used (Ex. 58).

The plan of the City proposing the use of fish ladders was strongly opposed by the witnesses for the Petitioners. Therefore, an analysis is presented of the testimony on the various features of the proposed facilities.

The Fish Rack or Barrier.—The fish experts for the Petitioners questioned the adequacy of the fish racks. This testimony was based principally on the experience with racks on other streams, particularly the Balls Ferry rack in Sacramento River below Shasta dam (Exs. 30, 35). The evidence indicates that in most instances the racks were not properly designed to withstand high flows (Ex. 35, p. 3). Witness Fry of Petitioners testified that if the racks are properly constructed the loss of fish will be small (R. 3089-90). Most of the criticism concerning the racks was directed to their use during the period of construction when the river flow is uncontrolled. In this connection Dr. Hubbs, testifying for the City, suggested that the rack should have movable sections to permit fish to pass during construction (R. 1739-40). After the project is in operation the river would be controlled and the racks would be subject to floods or heavy debris only on very rare occasions (Ex. 11). Regulated flows in excess of 10,000 c. f. s. at Mossyrock dam will prevail only about 2 percent of the time, based on the flow period of record (Ex. 10, Plate 10). From an engineering standpoint it is inconceivable that a fish rack could not be adequately designed and constructed to withstand the flows

that will occur at the racks. In any event, the fish racks could be tested by model study (R. 4011-13) and consequently do not offer an insuperable problem.

The Fish Ladders.—The testimony of the fish experts for the Petitioners indicates that the fish ladders at the Mayfield and Mossyrock dams would not prove successful, particularly because of their great height. To date, the highest dam that has been successfully laddered is Bonneville which has a height of 65 feet (Ex. 30). The principal objection of the fish experts for the Petitioners is that the fish arriving at Mayfield and Mossyrock dam sites will be greatly weakened due to their advanced sexual maturity and therefore would not have sufficient stored energy to climb the ladders with resulting failure to spawn and reproduce (R. 2921-22, 2956, 2959). There might also be considerable delay in finding the ladders (R. 2110-11, 3205-06). Witnesses Barnaby and McKernan of Petitioners testified that the salmon would expend more energy in going up the ladders and through the pools than they would by traversing the same stretch of the natural river (R. 2877, 3207-08) but they had no factual basis for their opinions. This testimony was disputed by Dr. Hubbs, fish biologist for the City (R. 1319-21, 1712). The testimony of several witnesses for the Petitioners indicates that it would take a life cycle of four years to determine whether the upstream migrants which successfully negotiated the ladders had failed to spawn and reproduce (R. 2922). They recommend, therefore, that the ladders be tested over several life cycles of the various species of fish on some other stream (Ex. 39, R. 2271). However, the record does not indicate what comparable dams are available for such testing and how such facilities could be installed without damaging such dams nor who would bear the considerable expense involved in such a test.

In his testimony Dr. Hubbs recommended that a combination ladder system and hauling system be adopted for passing upstream migrants over the dams, the hauling system for handling the fall chinooks and the ladder for the spring chinooks (R. 1716) because the probability of the fall chinooks climbing the ladder would be less since they are nearer sexual maturity. However, it was his opinion that the fall chinooks

would also successfully climb the ladder, although he had no detailed evidence, physiological or by observation, in support of his opinion (R. 1781).

Resting Pools.—The testimony of the witnesses for the City and the Petitioners is at variance with regard to the effectiveness of resting pools in the ladders. The Petitioners claim that resting pools should not be included in the ladders because the salmon would come to rest therein and fail to proceed to the top of the ladders (R. 3209–11). The City's witness, Dr. Hubbs, claims that resting pools are desirable to permit the salmon to recuperate its strength in ascending the ladders. He testified that salmon take advantage of resting pools in natural streams (R. 1315–16, 4014). He also testified that additional advice and experimentation is desirable (R. 4014).

The Attraction of Fish into the Ladders.—Witnesses for the Petitioners testified that the delay encountered in finding the entrance to the fish ladders would have a serious effect on the salmon and may result in mortality of the fish before reaching the spawning grounds (R. 2110–15, 3746–47). Dr. Hubbs expects the losses due to delay in finding the ladders would be small (R. 1716). The testimony indicates that more study and experiments are required to (1) determine the number and exact locations of the entrances to the fish ladders and (2) to establish the velocities necessary to attract the fish (R. 1710, 2111, 2873–74, 3206–07, 3709–10). In this connection the city has indicated its willingness to give this matter further study and to provide sufficient entrances at the locations recommended by the fishery interests and the license requires such further study.

Passing Upstream Fish into Mossyrock Reservoir.—A proposed method of passing the upstream migrants into the Mossyrock reservoir at various elevations of drawdown consists of five passageways through the upper portion of the dam at each twenty-five foot elevation above elevation 650 so that the distance through which upstream migrants would pass in moving from the ladders down into the reservoir would vary from zero to a maximum of twenty-five feet (Ex. 19, R. 861, 3657, 4015). The fish would slide down a smooth, watered chute (R. 1322–24, 4015). Petitioners' witness Barnaby testified that passing fish

down into the Mossyrock reservoir in the manner proposed by the City would injure the fish (R. 3658-59). The City's Dr. Hubbs testified that with proper experimentation the chute could be designed to pass the fish safely into the reservoir (R. 4015, 4061-62).

Trapping and Hauling Upstream Migrants.—An alternate method for passing the upstream migrants over the dams consists of trapping and hauling. The method proposed by the City would involve the passing of the upstream migrants into a ladder, their trapping and then having the fish hauled and released at some point above the dams (R. 1716; Ex. 14). The evidence shows that this method has proved to be reasonably satisfactory at the Mud Mountain dam, Washington, a flood-control project constructed by the Corps of Engineers (R. 3746; Ex. 59). The 1948 report of the Washington State Departments of Fisheries and Game in the Cowlitz Project (Ex. 25, p. 11) states that the success of trapping and hauling fish would be reasonably efficient and that no significant damage is expected to result from such an operation. This method of passing upstream migrants over dams is being used at other projects (Ex. 32, p. 47; Ex. 59, p. 19) and is planned by Washington State Department of Fisheries for passing fish over Tumwater Falls in connection with the Deschutes River project, Washington (Ex. 59, pp. 7-9). Petitioners' witness Barnaby testified that in his opinion the best method would be to trap and haul the upstream migrants (R. 3660).

CONCLUSIONS

There are several problems which require both engineering and biological study in connection with the ladder system before adoption of a final design, but the record does not support a rejection of such a system at this time. Furthermore, the record shows that the method of trapping and hauling should produce reasonably satisfactory results.

HANDLING DOWNSTREAM MIGRANTS DURING THE CONSTRUCTION PERIOD

At each of the proposed dams the City plans to construct large diversion tunnels to pass the river flow during the con-

struction period when it is necessary to unwater the river bed or during other phases of construction. The downstream migrants, during this period, will have to pass through these tunnels. During low flows these tunnels should offer no particular hazard since the water velocities would be low and the fingerlings generally go downstream at night (R. 2393-94, 3805). During high flows, especially at the Mossyrock tunnel which will be in operation for about 18 months (Ex. 11, pp. 49, 50), the fingerlings which migrate downstream will probably be subject to a somewhat greater hazard in passing through this tunnel. Streamflow records, however, show that during the spring months of April and May, when the bulk of the fingerlings migrate downstream, the river flows exceeded an average monthly flow of 12,000 c. f. s. only on two occasions during the 39-year period of record from 1908 to 1946 (Item A). A flow of 12,000 c. f. s. would produce a velocity in the Mossyrock tunnel of about 13 feet per second (Ex. 14, p. 37) which should not be detrimental to the fingerlings. Therefore, the record indicates that the problem of handling downstream migrants during the construction period will be adequately solved.

HANDLING DOWNSTREAM MIGRANTS DURING THE OPERATING PERIOD

The downstream migrant fishery facilities proposed for use after construction of the dams consist of means of screening the water before it enters the intakes to the powerhouse and of passing the fingerlings hydraulically from the headwater to tailwater. At Mossyrock the fingerling system consists essentially of fish intakes adjacent to the turbine entrance screens, water passages to direct water containing the fingerlings into the dam and thence into collecting chambers for subsequent depressurizing and releasing into the fish ladders for passage downstream. A similar system is also provided at higher levels in the dam above the turbine intake level, except that no screening of flows will be necessary (Ex. 9).

The collection chamber will contain a fish screen to prevent the fingerlings from passing through the conduit system into the turbines (Ex. 9). This screen was the subject of considerable testimony by the Petitioners' witnesses who claimed

the screen would clog due to debris or would cause injury to the fingerlings (R. 2888-90). The fingerling entrance ports were also the subject of considerable testimony because the Petitioners did not believe the fingerlings would be able to find or use them, especially in the upper levels of the dam away from the turbine intake entrances (R. 2880, 3713). Testimony with respect to the chances for successful operation of these ports was conflicting in that some expert testimony indicates that they would work satisfactorily (R. 1343-44, 3225, 3671-73) while other witnesses assumed that the fingerlings would have to be very close to a port before being attracted (R. 2120, 2881, 3713-14).

At Mayfield there would be no collection chamber or depressurizing of the fingerlings. They are to be screened in front of the turbine intakes and passed directly into a fish ladder for descent into the natural channel below the dam (Ex. 14, pp. 7-11, Plates I and II).

The hydraulic design of the fingerling system at Mossyrock is such that flows through it can be varied over a considerable range to accommodate the various fish habits which may be encountered (R. 883-887, 894-897, 900, 909-912).

Passage of the Larger Fish Through the Downstream System.—The water passages through the downstream fingerling system are sufficiently large to pass the adult steelheads and sea-run cutthroat trout which migrate downstream after spawning (R. 837, 2884-85; 3972-74).

Screening of Intakes to Turbine Entrances.—The entrances to the Mossyrock turbines constitute large areas located at considerable depths in the reservoir. The problems of keeping these screens clear of debris and fish tight might entail some difficulties in design, construction and operation, but this is chiefly an engineering problem capable of solution.

At the Mayfield dam the fish screens will be closer to the surface and their design, construction and operation should prove easier of solution.

The City and the Petitioners conducted screen model tests to determine the rapidity of clogging (Exs. 14, 28). The City found that the water at the intakes of the Alder dam (where its tests were conducted) carried little debris (Ex. 14, p. 18-A;

R. 4209-18) while the Petitioners' test indicated that the water passing through the Baker River power plant carried sufficient debris to require the screens to be cleaned after 3 to 5 days of operation (R. 3869; Ex. 28, pp. 36-38). There is no evidence to indicate specifically what might be expected on the Cowlitz River with respect to debris which might clog fish screens, particularly the ones in front of the turbines at Mossyrock. There is also no evidence which might indicate the economic consequences which would result from frequent cleaning of screens, but it is inconceivable that such maintenance could materially affect the economics of the proposed development.

Predatory Fish.—There was some testimony by Petitioners' witness that predatory fish would congregate in the vicinity of the entrance ports, in the collection chambers and in the fish ladders and feed on the fingerlings (R. 3579-83). This testimony was of a qualitative nature but did not prove that such losses would exceed those which occur in nature due to the predators. Also, since the fingerlings migrate chiefly at night and since the predators feed by sight (R. 1703, 1783-84, 1803-04) there is no reason to expect an unusual loss of fingerlings to predators.

CONCLUSION

The record does not show conclusively whether certain features of the facilities for passing downstream migrants will be adequate to prevent excessive losses, but the record does indicate that with proper testing and experimentation it should be possible to provide fish passage facilities which will prevent undue losses of downstream migrants. Consequently, further tests and experimentation should be made before the permanent features of the fish passing facilities are constructed.

THE FISHERY CONSERVATION PRACTICES, PROJECTS AND FACILITIES PROPOSED BY THE CITY

In connection with its Cowlitz Project, the City proposed certain means to conserve the fishery resource of the Cowlitz River. These are presented under the following topics.

The Laddering of Natural Obstructions and Falls.—The City proposes to provide ladders or other suitable means to pass salmon and sea-run trout over natural obstructions and troublesome falls (R. 1395-96, 1445, 2953; Ex. 10). Petitioners noted that the Lower Columbia River development program includes the same stream-improvement matters (R. 2946-48, 2953) and suggest that nothing new would be added by the City (Ex. 30, p. 7). The Lower Columbia program is listed in Exhibit 31 (p. 16) and to the extent that the City's program would provide further facilities it would be an additional benefit. Obviously, if the City finances any or all of the stream-improvement program, it would be making a definite economic contribution to the Lower Columbia fishery program. This matter merits further study.

The Provision of Fish Hatching Facilities.—The City would provide such fish hatcheries as may reasonably be necessary for purposes of the Cowlitz Project. To the extent that such hatcheries are in excess of those proposed in the Lower Columbia River program as it relates to the Cowlitz River they will be definite improvements. Further, if the City participates in the costs of such fish hatcheries, it will be making a definite contribution to the fishery program, thus making it unnecessary to provide State and Federal funds for that purpose. As no specific program was presented in the record, the license requires that the matter of fish hatcheries be explored further.

The Increase in Spawning Area Above and Below Mayfield.—The increase in spawning area above Mayfield would be attributed to laddering of obstructions now blocking fish migration and the removal of material at other obstructions blocking migration in varying degrees. There is not sufficient evidence in the record to show whether the City's plan will provide spawning area above Mayfield in addition to that contemplated in the Lower Columbia River program. This feature must be given further study.

There will definitely be an increase in spawning area below Mayfield because of increasing the natural minimum flow of 1,092 to a minimum regulated flow of 2,000 c. f. s. (R. 3018; Ex. 28, pp. 16-18), but the amount of such increase has not

been determined (R. 3832-33). However, the gain in spawning area below Mayfield that will result when flows are increased from 1,550 c. f. s. to 2,000 c. f. s. was estimated by Petitioners to be 65,070 square yards after a survey made when actual flows were 1,550 c. f. s. (Ex. 28, p. 16). It might well be, due to river bed contours, that a survey comparing the natural minimum flow of 1,092 c. f. s. with a flow of 1,550 c. f. s. would show a gain of about 120,000 square yards in spawning area in the river bed affected. Thus the total gain in spawning area would probably be in the order of 185,000 square yards as a result of increasing the natural minimum flow of 1,092 c. f. s. to a minimum regulated flow of 2,000 c. f. s. as required by the license.

It has been suggested that the gain in spawning area below Mayfield resulting from increased minimum flow of 2,000 c. f. s. would not be of practical value because of the adverse effects of daily variation in flows due to power operations (R. 3624). As the Cowlitz smelt ran into the Lewis River during 1949 and 1950 below the Ariel hydroelectric plant, which is operated as a peaking plant with resultant fluctuations in flow, the effect of variations in flow on smelt does not appear to be adverse (R. 3809-11). Power operating and load curve studies show that it is not necessary to run the Mayfield plant for peaking and it could be run at constant loads (R. 4198-99). Further it was suggested by reference to Ariel dam that there would be a change in temperatures and chemical content of the water with adverse effects which would more than offset the gains in spawning area (R. 2161-67, 2180-85; Ex. 28, pp. 24-28). Based on the record it is difficult to consider seriously the claimed adverse effect of temperatures and chemical content changes because of the benefits therefrom as experienced on the Sacramento River below Shasta and Keswick developments (R. 3152-53), and on the Skagit River below Gorge, Diablo, and Ross hydroelectric developments (R. 2306). These benefits are attributable to the colder water provided from the reservoirs during the summer and fall months. A like situation would exist if the Mayfield and Mossyrock developments were constructed. It would be well to note that where there are

dams in series on a river, benefits to fish are provided as noted above.

In short, the gain in spawning area below Mayfield would be beneficial and there is nothing in the record to prove that water temperature or chemical conditions in the river below Mayfield dam would be adverse to anadromous fish.

Pollution Abatement below Mayfield.—Some pollution of the harmful type exists on the Lower Cowlitz River (R. 2209-10, 2276-77, 2976-77, 3636, 3788). Although the record does not show whether such pollution is in lethal concentrations, it is to be expected that with growth of industry in the Lower Cowlitz River harmful pollution could be so serious as to require considerable investment in remedial facilities. The increase in minimum flows from 1,092 c. f. s. to 2,000 c. f. s. would be a definite contribution by the Cowlitz Project to pollution abatement.

Spawning Areas in Cowlitz Project Reservoirs.—Data in the record indicate that the Mayfield reservoir would flood out 116,400 square yards of existing spawning area and Mossyrock reservoir, 298,265 square yards, the total being 414,665 square yards. (Ex. 28, p. 18). In the Mayfield reservoir there would be 200 acres with a submerged depth of less than 10 feet (R. 4263). The amount of the area so submerged that might be suitable for spawning is not known but salmon have been observed spawning in depths up to 12 feet (R. 3851).

The area to be inundated by the Mayfield and Mossyrock reservoirs is accountable for 90,571 pounds (933,717 pounds times 9.7 percent) of fall chinook (Ex. 28, pp. 6, 13), corresponding to 6,378 fish. With improved flow conditions and greater spawning area below Mayfield it is expected that much of the loss of fall chinook resulting from flooding of the spawning areas in the reservoir sites would be offset by gains below Mayfield (Ex. 39, p. 11). The extent of offset would be established to greater accuracy after completion of studies of gain in spawning areas below Mayfield which would result from increasing minimum flows from 1,092 c. f. s. to 2,000 c. f. s.

CONCLUSIONS

The City proposes conservation practices, facilities and improvements for conservation of the fishery resources of the Cowlitz River. Such proposals and the effects thereof are not sufficiently detailed to permit an adequate appraisal of their effectiveness. They show enough promise to warrant the carrying through of more detailed studies and plans.

APPENDIX D

DEPARTMENT OF THE INTERIOR

INFORMATION SERVICE

DEPA—P. R. No. 116.

Defense Electric Power Administration.
For immediate release January 16, 1953.

DEPA TEMPORARILY SUSPENDS BAN ON INTERRUPTIBLE ELECTRIC POWER IN PACIFIC NORTHWEST AREA

James F. Davenport, Administrator of Defense Electric Power Administration today signed an order temporarily suspending the ban on the use of interruptible electric power in the Pacific Northwest area.

The order suspends Direction 1 to DEPA Order EO-4A, and follows closely upon one signed by him on January 13, 1953, restoring the ten percent curtailment of firm power in the same region. Both steps were taken as a result of improved water conditions caused by heavy rains and on the recommendation of the Northwest Advisory Committee.

Owing to crucial drought conditions in the Pacific Northwest which began last September, the sale or use of interruptible electric power was banned by DEPA on November 1, 1952. Recent rains have now restored normal water flow and replenished the various reservoirs and storage areas, making the ban on interruptible no longer completely necessary.

DEPA states that it is not expected that its suspension of the ban on interruptible power deliveries will be followed by full resumption of such deliveries, but that DEPA's action will permit service to interruptible customers from time to time as power is available.

Administrator Davenport's message to the principal electric utilities affected by the suspension of the ban on interruptible was also sent to the Northwest Advisory Committee and other

cooperating groups in the shortage area which consists of the States of Washington, Oregon, and a portion of Idaho. The Governors of these States were also notified of the lifting of the ban. Administrator Davenport's wire reads as follows:

DEPA Advisory Committee advises that water conditions now considered sufficient to service firm load to end of storage season. Directon one to Order EO-4A is temporarily suspended. Effective immediately.

DEPARTMENT OF THE INTERIOR

INFORMATION SERVICE

DEPA P. R. No. 115.

Defense Electric Power Administration
For release January 13, 1953

DEPA RESTORES 10 PERCENT CUT IN FIRM POWER IN PACIFIC
NORTHWEST AREA

Administrator James F. Davenport of the Defense Electric Power Administration announced today that because of heavy rains and improved water conditions, Defense Electric Power, on recommendation of the Northwest Advisory Committee, has lifted its restrictions which impose a general ten percent curtailment of firm power in the Pacific Northwest Region.

The quota restrictions on the use of firm power in the region, which have been in effect since November 17, 1952, under the terms of Direction 2 to Order EO-4A, on all users of firm power in excess of 8,000 kwh. weekly, have now been removed as well as the need for voluntary curtailment by smaller users.

DEPA states, however, that previous restrictions on the use of interruptible power, which went into effect on November 1, 1952, remain in force. Moreover, it will still be necessary to continue more than normal use of steam generation to make up for the deficiency in water power.

J. Frank Ward, chairman of the Advisory Committee, in a wire to DEPA stating that the advisory group recommends lifting the curtailment, describes the weather and water conditions in the area as being much improved by recent rains and that "firm loads can be carried during rest of drawdown season

without curtailment and with some remaining reserve, assuming full steam operation."

On the basis of these conditions, Ward said, "the operating committee and advisory committee recommend immediate lifting of mandatory and voluntary curtailment required by Directive 2 of EO-4A. We recommend also that Directive 1 referring to interruptible loads and Order EO-5 be retained in effect."

The advisory committee, the interested utilities and the Governors of the States of Washington, Oregon and Idaho were notified today of the lifting of the ten percent cut by DEPA in the following telegram signed by Administrator Davenport:

Acting on advice of Northwest Power Pool Operating Committee, the DEPA Northwest Advisory Committee has recommended revocation of Direction 2 to DEPA Order EO-4A. DEPA hereby revokes effective immediately Direction 2. Deliveries of interruptible power prohibited. Forms DEPA-31 and 32 not required for week beginning January 12. Utilities will please complete curtailment records to January 12.

APPENDIX E

CITY OF TACOMA

DEPARTMENT OF PUBLIC UTILITIES OPERATING THE MUNICIPAL
ELECTRIC LIGHT, POWER, WATER AND BELT LINE RAILWAY
SYSTEMS

TACOMA 2, WASH., *April 8, 1952.*

FEDERAL POWER COMMISSION,
Washington 25, D. C.

GENTLEMEN: Under the terms of the license issued to the city of Tacoma for the Cowlitz Power Development we are required to carry on certain research work in connection with the development of fish facilities and the demonstration of their adequacy and to report quarterly on the progress of the work carried on with regard to all phases of the project. A brief report complying with this requirement has been forwarded to Mr. Leshar Wing as of April 2.

The purpose of this letter is to advise the Commission of the steps which the City has taken looking toward establishment of proper cooperative arrangements with the Department of Interior and the Departments of Fisheries and Game of the State of Washington regarding fishery problems. Copies of correspondence involved are attached for your information and the steps taken can be reviewed briefly as follows:

On December 1, Messrs. Dean Barline and J. Frank Ward, met with Secretary of the Interior, Oscar L. Chapman, in Portland, Oregon, and discussed the need for a definite arrangement to undertake cooperative studies. This was followed by a letter from Mr. C. A. Erdahl, Commissioner of the Department of Public Utilities, to Mr. Chapman on December 3, 1951, to which Mr. Chapman replied that the United States Fish and Wildlife Service would zealously cooperate with the City along the lines indicated in the license. Shortly following discussions with Mr. Chapman, telephone calls were made to Mr. John A. Biggs, Director of the Department of Game

of the State of Washington and Mr. Robert J. Schoettler, Director of the Department of Fisheries of the State of Washington, requesting appointments when the officials of the City and the Department of Fisheries and Game might explore the work to be undertaken with regard to fishery problems. These attempts to initiate a cooperative program met with no success, but rather with postponement by the Departments of Fisheries and Game on the stated assumption that the projects were not likely to be built. This matter was called to the attention of Governor Langlie of the State of Washington, and his reply also is attached.

Following this exchange of correspondence and subsequent to the action taken by the City to institute suit in the Superior Court of the State of Washington in Thurston County and by the Departments of Fisheries and Game of the State of Washington in the 9th United States Circuit Court of Appeals, Secretary Chapman advised the City that in view of the litigation, cooperation of the United States Fish and Wildlife Service would be postponed. Mr. Erdahl has again written to Secretary Chapman urging the designation by him of persons on his staff who could initiate the studies in this very necessary program of cooperation.

The City is prepared to engage consultants and set up pilot plant tests and do the engineering design work which is required.

We hope that this program can be gotten under way at an early date, but feel that we have already given evidence of our desire to carry out the requirements of the license with regard to fishery facilities although our efforts have not met with the cooperation we feel we are entitled to receive.

Yours very truly,

J. FRANK WARD,
Superintendent, Light Division.

DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY

WASHINGTON 25, D. C., *February 13, 1952.*

MY DEAR MR. ERDAHL: In my letter of January 5 I wrote that the Fish and Wildlife Service would extend full cooperation toward fulfilling the Federal Power Commission's requirements for the Cowlitz River power development.

Shortly thereafter, I learned that the State of Washington is preparing to take legal action to prevent the construction of the dams covered by the Federal Power Commission license. Under these circumstances, it seems inappropriate for the Fish and Wildlife Service to do anything other than to stand by until the legal issues have been resolved.

Sincerely yours,

(S) OSCAR CHAPMAN,
Secretary of the Interior.

MR. C. A. ERDAHL,

Commissioner of Public Utilities, Department of Public Utilities, City of Tacoma, Tacoma 2, Wash.

THE DEPARTMENT OF GAME

JOHN A. BIGGS, DIRECTOR

509 FAIRVIEW AVENUE NORTH

SEATTLE 9

JANUARY 21, 1952.

MR. J. FRANK WARD, *Superintendent,*
Light Division,

City of Tacoma, Department of Public Utilities,
Tacoma 2, Wash.

DEAR MR. WARD: I am in receipt of your letter formally requesting initiation of a series of conferences between the Departments of Game and Fisheries and the Department of Public Utilities of the City of Tacoma for the purpose of discussing problems incidental to the passage of fish through the proposed dams on the Cowlitz River. I note that you propose rather a complete agenda covering phases which from your viewpoint, appear to be worthy of discussion,

I share the views of Mr. Schoettler that because of the litigation now pending having to do with the construction of the dams and because I fail to feel that there is any immediate assurance that the dams will be constructed, I do not believe it desirable to divert the time of our technicians, badly needed on other projects, to your particular project at this time.

Yours very truly,

(S) J. A. Biggs,
JOHN A. BIGGS, *Director,*
The Department of Game.

ROBERT J. SCHOETTLER,
Director of Fisheries.

CITY OF TACOMA

DEPARTMENT OF PUBLIC UTILITIES
OPERATING THE
MUNICIPAL ELECTRIC LIGHT, POWER, WATER AND BELT LINE
RAILWAY SYSTEMS

TACOMA 2, WASH., *April 2, 1952.*

The HONORABLE OSCAR L. CHAPMAN,
Secretary of the Interior,
Washington, D. C.

DEAR MR. CHAPMAN: It has been some time since your letter of February 15, 1952, was received with regard to the Cowlitz Power Development.

We were very pleased to receive your first letter of January 5, with regard to the full cooperation which we might expect from the Fish and Wildlife Service.

As you know, we have entered suit in the Thurston County Superior Court to settle any and all legal questions remaining with regard to the Cowlitz Development as it may be affected by laws of the State of Washington. You probably also know that the Departments of Fisheries and Game of the State of Washington have entered an appeal in the United States 9th Circuit Court of Appeals taking exception to the granting of the license by the Federal Power Commission. These legal actions, undoubtedly, will be carried to their final conclusion. However, it still seems to us that the logical course to pursue

would be to undertake the study of the fisheries problems which the Cowlitz Power Development presents, pending the outcome of litigation.

We cannot help but be in agreement with the statement which Dr. Meehan made before the Subcommittee of the Committee on Appropriations of the House on the Civil Functions, Department of the Army Appropriations for 1953 in which he stated that: "If it were possible to do some research on the construction of devices that could be used to get fish over the dams, both upstream or downstream, we could probably come up with a fairly sound answer." With regard to the plans of the City of Tacoma he stated that: "If somebody were able to do some research on it to see whether or not it would work, or make it work, that would be helpful.

It seems to us that the delay of research work with regard to the fisheries problem at this particular project is not justifiable even in the face of litigation and regret that you have found it necessary to be a party to such delay.

It is significant that the appropriations which have been requested in the hearings above referred to, involve some \$2,438,935 which is to be spent by the State of Washington under your direction; that no mention is made, in requesting these monies, of research which should be done to solve the problem; and further, reference to the license granted by the Federal Power Commission on the Cowlitz assumes the loss of the spawning areas in that stream.

We would appreciate your reconsideration of this matter and assignment immediately of some one from your staff of the Fish and Wildlife Service to approach these problems constructively.

Yours very truly,

C. A. ERDAHL,
Commissioner of Public Utilities.

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
OPERATING THE
MUNICIPAL ELECTRIC LIGHT, POWER, WATER AND BELT LINE
RAILWAY SYSTEMS

TACOMA 2, WASH., *July 1, 1952.*

FEDERAL POWER COMMISSION,
100 McAllister Street
San Francisco 2, Calif.

Attention: Mr. Leshar S. Wing,
Regional Engineer 100-2 CORRES.
Subject: Project No. 2016—Washington,
Cowlitz Power Development,
Article 30, Opinion No. 221.

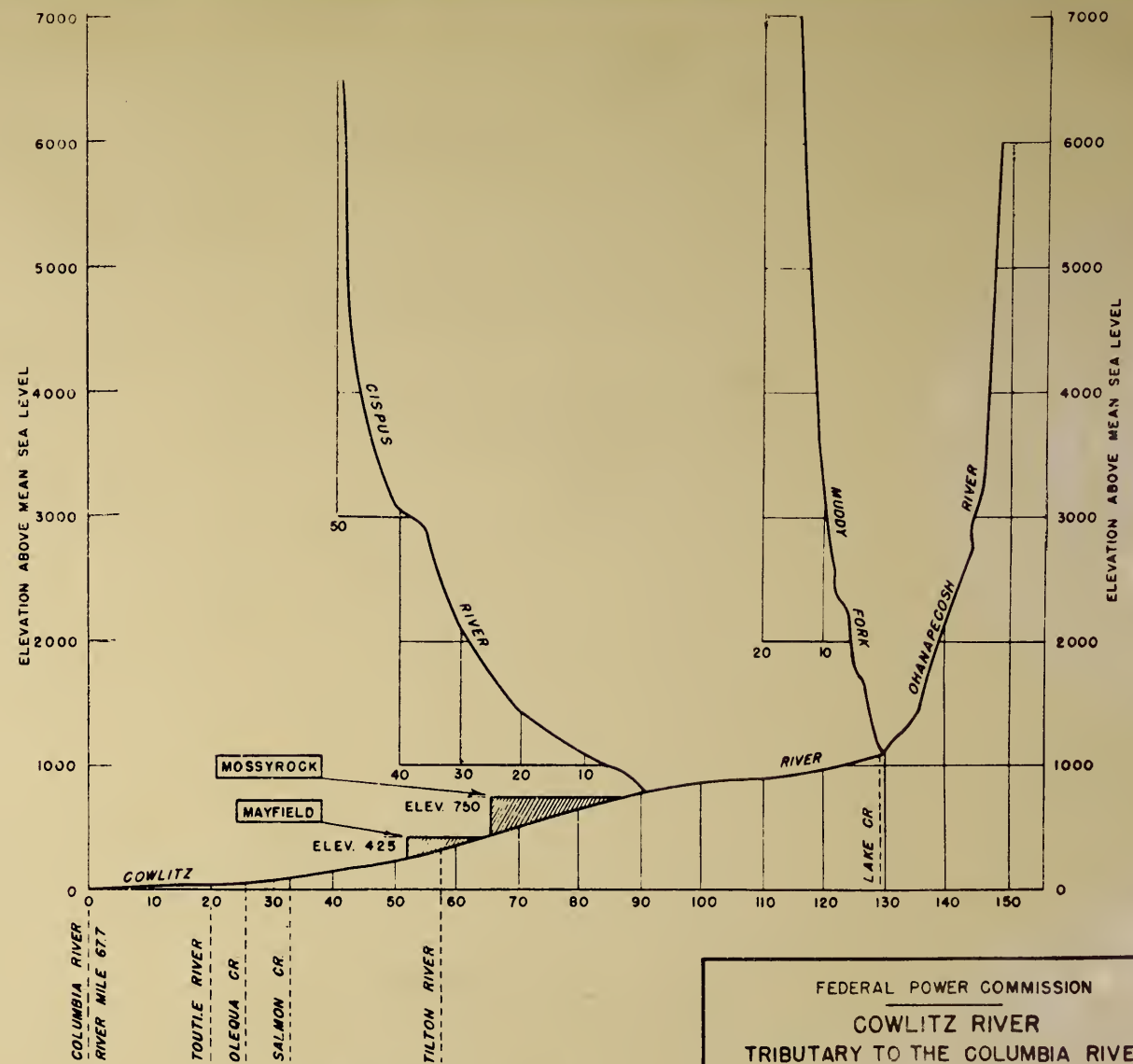
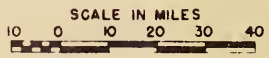
GENTLEMEN: In accordance with Article 30 of above subject Opinion No. 221, we are submitting herewith our quarterly report.

Studies are being continued on details of the drawings showing fishway facilities at both dams. Further data is being obtained on fishways now in operation or proposed in this country and abroad.

No further progress has been made in the furtherance of studies with or securing the cooperation of the State Departments of Fisheries and Game or the Fish and Wild Life Service pending court decisions covering the suits now in the Thurston County Superior Court and Circuit Court of Appeals in San Francisco. Explanation of this situation was outlined in our letter of April 17th.

Yours very truly,

J. FRANK WARD,
Superintendent, Light Division.



REFERENCE - CHART 2, AND MAP 4-B
 HOUSE DOCUMENT NO. 666
 71 ST CONGRESS, 3RD. SESSION

FEDERAL POWER COMMISSION
COWLITZ RIVER
 TRIBUTARY TO THE COLUMBIA RIVER
 PLAN AND PROFILE
 APPLICATION FOR LICENSE - PROJECT NO. 2016

